

BEFORE THE SECRETARY OF THE INTERIOR
PETITION TO LIST SEVEN PANGOLIN SPECIES AS
ENDANGERED PURSUANT TO THE U.S. ENDANGERED
SPECIES ACT



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Petition to List Seven Pangolin Species as Endangered

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NOTICE OF PETITION

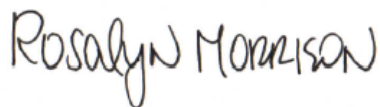
Pursuant to Section 4(b) of the Endangered Species Act (“ESA”), 16 U.S.C. § 1533(b),

Section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e), and 50 C.F.R. § 424.14(a), Petitioners, Born Free USA, Center for Biological Diversity, Humane Society International, Humane Society of the U.S., and the International Fund for Animal Welfare, hereby petition the Secretary of the Interior and the U.S. Fish and Wildlife Service (“USFWS” or “the Service”) to list seven species of pangolin (*Manis pentadactyla*, *M. javanica*, *M. culionensis*, *M. crassicaudata*, *M. tricuspis*, *M. gigantea*, and *M. tetradactyla*) as Endangered. 16 U.S.C. § 1532(6) (“The term ‘endangered species’ means any species which is in danger of extinction throughout all or a significant portion of its range...”).

This Petition presents substantial scientific and commercial information indicating that these pangolin species are in danger of extinction throughout all or a significant portion of their range. *See* 50 C.F.R. § 424.14(b)(1) (“substantial information” is “that amount of information that would lead a reasonable person to believe that the measure proposed in the Petition may be warranted”). Therefore, the Secretary of the Interior must make an initial finding “that the petitioned action *may be* warranted.” 16 U.S.C. § 1533(b)(3)(A)(emphasis added) (The Secretary must make this initial finding “[t]o the maximum extent practicable, within 90 days after receiving the Petition”); *HSUS v. Pritzker*, 2014 WL 6946022 (D.D.C. 2014) (holding that conclusive evidence is not required to make a positive 90-day finding). The Petitioners are confident that a status review of the species, as required by 16 U.S.C. § 1533(b)(3)(B), will support a finding that listing these seven pangolin species as Endangered is in fact warranted.

Pangolins are the most illegally trafficked wild mammal in the world, yet only one of the eight pangolin species is currently protected under the ESA. 50 C.F.R. § 17.11 (listing *Manis temmincki* as Endangered). All pangolins are in danger of extinction, primarily due to overutilization for commercial and recreational purposes, which is facilitated by the lack of adequate regulatory mechanisms internationally and domestically. The USFWS has a duty to protect these imperiled species as Endangered under the federal Endangered Species Act, which would meaningfully contribute to pangolin conservation by strictly regulating the import, export, and interstate commerce in pangolin parts and products. *See* 16 U.S.C. § 1531(b),(c) (providing that federal agencies “shall utilize their authorities in furtherance of” the conservation purpose of the ESA). Therefore, the Petitioners strongly urge the Service to grant this Petition and conduct a status review of *M. pentadactyla*, *M. javanica*, *M. culionensis*, *M. crassicaudata*, *M. tricuspis*, *M. gigantea*, and *M. tetradactyla*.

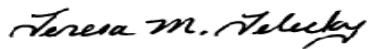
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EXECUTIVE SUMMARY

This Petition demonstrates that the seven species of pangolin currently not protected by the Endangered Species Act (ESA), *Manis pentadactyla*, *M. javanica*, *M. culionensis*, *M. crassicaudata*, *M. tricuspis*, *M. gigantea*, and *M. tetradactyla*, meet the statutory criteria for an Endangered listing under the Act. The eighth species of pangolin, *M. temminckii*, is listed as Endangered under the ESA.

The petitioners – Born Free USA, Center for Biological Diversity, Humane Society International, the Humane Society International, and the International Fund for Animal Welfare – submit this Petition to the Secretary of the Interior and the U.S. Fish and Wildlife Service (USFWS) requesting the listing of seven pangolins species as Endangered under the ESA. The ESA requires listing a species as “Endangered” when it “is in danger of extinction throughout all or a significant portion of its range.” 16 U.S.C § 1532(6). This Petition demonstrates that all seven species not currently listed are declining rapidly and are in danger of becoming extinct warranting an Endangered classification for each species throughout its range.

The ESA requires the Secretary to determine within 90 days of receiving a petition whether the petition “presents substantial scientific or commercial information indicating that the petitioned action may be warranted.” *Id.* § 1533(b)(3)(A). Such determination must be made solely on the basis of the “best scientific and commercial data available.” *Id.* § 1533(b)(1)(A). Following a 90-day finding, the Secretary must, within one year of receipt of the petition, complete a review of the status of the species, publish a finding of whether the action is warranted and, if so, promptly propose a rule to change the listing status. *Id.* § 1533(b)(3)(B). Should a rule be proposed, the Secretary has an additional year to finalize regulations protecting the species. *Id.* § 1533(b)(6)(A).

Once foreign species are listed as Endangered, protection under the ESA occurs by, *inter alia*, prohibiting import, export, and interstate commerce in live animals and derivatives, unless such activity enhances the propagation or survival of the species or is for conservation science purposes. *Id.* § 1533(b)(1)(A). Furthermore, Section 8 of the ESA provides for “International Cooperation” in the conservation of foreign species, and listing foreign species heightens global awareness about the importance of conserving the species which is essential for a lesser known animal such as the pangolin.

This Petition lays out the current status, distribution, and population trends of the seven pangolin species currently not listed as Endangered. The Petition describes the morphology, behavior, and natural history as well as the specific habitat requirements of each species. The Petition describes the many threats facing pangolins including overutilization (mainly from poaching) and habitat loss, and how these threats constitute an untenable situation for pangolins that will result in their extinction unless remedied. The Petition evaluates the burgeoning intercontinental trade in pangolins, both live and processed, and how it threatens the conservation status of the species. Despite a variety of international and foreign laws regulating trade, pangolins continue to be one of the most trafficked wild animals in the world. Listing all pangolins as Endangered is necessary to promote conservation of these species, both here and abroad, as required by law.

Status and Distribution

There are eight species of pangolins, four in Asia and four in Africa. One of the African species, *Manis temminckii*, is listed as Endangered under the ESA while the seven other pangolin species are not listed. The best available science indicates that all seven pangolin species not currently listed under the ESA are in serious decline (Challender & Hywood, 2012; Zhou et al., 2014; Soewu & Sodiende, 2015). All seven species are listed on the International Union for the Conservation of Nature's (IUCN) Red List of Threatened Species and classified as Critically Endangered (extremely high risk of extinction), Endangered (very high risk of extinction), or Vulnerable (high risk of extinction). Experts indicate that the two Critically Endangered pangolin species, *M. pentadactyla* (Chinese or Formosan pangolin) and *M. javanica* (Malayan or Sunda pangolin), both Asian species, could go extinct within 10 years if current trends continue (Challender et al., 2014a; Challender et al., 2014b). The other two Asian species; *M. crassicaudata* and *M. culionensis*, are listed by the IUCN as Endangered. In Africa, comprehensive surveys of hunters and market traders indicate that pangolin populations have been declining for decades, and are expected to continue to decline given current trends (Soewu & Ayodele, 2009; Soewu & Adekanola, 2011; Waterman et al., 2014). All four African pangolin species, including the ESA-listed *M. temminckii*, are listed by the IUCN as Vulnerable.

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Pangolins reside in areas experiencing some of the fastest human population growth and subsequent land conversion rates. In Asia, urbanization and conversion of forest for palm oil plantations, especially in Southeast Asia, are serious threats to pangolin habitat. In Africa, deforestation is a major contributor to habitat loss as extraction activities including the oil, logging, and mining industries increase, leading to more roads and fragmentation (Laurance et al., 2006; Poulsen et al., 2009). Loss of forest cover will continue to reduce available habitat for the species (Akpona et al., 2008).

Overutilization for Commercial, Recreational, or Scientific Purposes

In Asia, pangolins frequently and disproportionately fall victim to the wildlife trade (Challender, 2011). In China, Viet Nam, and other Asian countries, pangolins are considered delicacies, and ordering one at a restaurant is considered a status symbol. In addition, pangolin scales, blood, and fetuses are used to make traditional Chinese medicines that purportedly treat a variety of conditions such as liver problems, skin issues, palsy, and swelling (Li, 1982; Qiu, 1985; Gao, 2012). As China and other Asian countries continue to develop economically, the number of affluent customers able and willing to pay high prices for pangolin medicine and meat is increasing. This phenomenon is what has driven the Chinese pangolin (*M. pentadactyla*) to near extinction (Zhou et al., 2014; Challender et al., 2014a) and has led to increasing pressure on species in Southeast Asia and Africa from poaching and international trade. Experts believe that *M. javanica*, which is native to Southeast Asia, is Critically Endangered, and the other two Asian species are Endangered, primarily because of the trade (Challender et al., 2014c; Baille et al., 2014, Lagrada et al., 2014). Authorities are regularly seizing large shipments of pangolin

products on the way to China and Viet Nam from the Philippines, Indonesia, and Malaysia (Zhou et al., 2014).

Asian demand for pangolins and pangolin products is so strong that it is also affecting the African pangolin species through international trade (Challender & Hywood, 2012). Large shipments from African countries bound for China and Viet Nam are seized regularly, indicating an illegal intercontinental trade in species that are already over utilized by their own range countries (Challender & Hywood, 2012; Zhou et al., 2014). In West and Central Africa, where the currently un-listed African pangolin species reside, hunting for bushmeat has led to declines in many mammal species, and pangolins are heavily impacted (Fa et al., 2002; Fa et al., 2006; Bennet et al., 2006). Their meat is preferred over many other types of bushmeat, leading to high demand (Fa et al., 2006). Furthermore, pangolins are the subject of a thriving and pervasive traditional medicine trade. Many different ethnic groups use a variety of different parts of the animal to treat dozens of conditions from skin deformities to ailments of the spirit (Soewu & Adekanola, 2011; Boakye et al., 2014). While there are no population estimates, evidence indicates that pangolin populations throughout Africa are in serious decline (Boakye et al., 2014; Soewu & Sodiende, 2015). Hunters and traditional medicine practitioners are finding pangolins harder and harder to capture in the bush and more and more expensive at the market (Soewu & Ayodele, 2009; Soewu & Adekanola, 2011). With projected increases in human population, demand for pangolin meat and parts will only increase leading to even more hunting pressure. In addition, continued habitat destruction through urbanization and resource extraction will further threaten pangolin survival in these regions.

To quantify illegal and legal trade in pangolins, the petitioners conducted an original analysis of data compiled by the World Conservation Monitoring Centre on species of flora and fauna listed on the Appendices of the Convention on International Trade in Endangered Species (CITES), as well as an analysis of Law Enforcement Management Information System (LEMIS) data of U.S. imports and exports of flora and fauna, and analyzed publically available reports on seizures made by authorities. The original analysis of CITES trade data presented in this petition analyzed data on pangolins and their products that were legally traded internationally between 2004 and 2013 (the most recent years for which data are available) and found the trade of approximately 11,268 individuals. Conversely, original analysis of the illegal trade through data on seizures of pangolins and their parts during the same time period indicates the immense scale of overutilization through the illegal international trade in pangolins and their parts, with an estimated 930,370 pangolins traded illegally during this period. This estimate was calculated by extrapolating seizure quantity data from publically available seizure reports using the INTERPOL rule of thumb that estimates that only about 10% of actual total illegal trade levels are evident from seizures (Christy, 2012). This illicit trade is the primary threat to pangolins in Asia, and evidence now suggests that African pangolins are also being targeted for intercontinental trade to Asian markets (Challender, 2012). The analysis of international seizure data (mostly scales, live animals, bodies, and meat) including imports of pangolin products seized in the U.S. (mostly items identified as medicines) indicates continuing demand for pangolins and their products, which indicates persistent pressure on a massive scale.

Inadequacy of Existing Regulatory Mechanisms

All eight species of pangolin are currently listed under Appendix II of CITES, which lists species that may become threatened with extinction unless trade is closely controlled. The four Asian species have the additional protection of a zero export quota. Despite this protection, pangolins continue to be shipped, driven, or otherwise transported across international borders hidden in containers or disguised as legal goods. Despite the multiple tons of pangolins and their products seized every year, it is estimated that authorities only catch 10-20% of the total trade (Zhou et al., 2014).

All Asian pangolin range States have local laws that apply to pangolins, but enforcement of these laws is not strong enough to reduce rampant poaching, undermining the efficacy of the CITES designation (Challender, 2011). In fact, loopholes exist in China and Viet Nam that allow seized pangolin parts to be legally sold, providing a cover for illegal trade.

In Africa, pangolins are protected to varying degrees by range country laws, but these laws are often rarely enforced and surveys of hunters, traditional medicine practitioners and bushmeat merchants indicate that most people are not aware that the laws even exist (Soewu & Ayodele, 2009; Soewu & Adekanola, 2011). Even in the rare circumstance when a pangolin poacher is convicted, the sentence tends to be light (Boakye et al., 2014). The U.S. imports pangolin products both through legal and illegal means, directly contributing to the unsustainable trade. Clearly the current regulations, in the U.S., in the range countries, and internationally, are not adequate to prevent the precipitous decline of pangolin species.

Other Factors

Pangolin life history characteristics make them highly susceptible to overexploitation and pervasive poaching. Pangolins are slow moving and have poor eyesight, making them vulnerable to snares (Burton, 2009). Their defensive posture of curling into a ball allows poachers to easily capture them (Zhou et al., 2014). Furthermore, pangolins most likely recover slowly from extreme hunting pressure due to their low population density and low reproductive rate (Heath, 1992a); pangolins produce only one offspring per year (Lim and Ng, 2007). Attempts to captive breed pangolins have not been successful, and they are extremely difficult to keep alive in captivity.

Conclusion

All seven pangolin species currently not listed under the ESA have been declining rapidly for decades due to consistent and pervasive demand for their meat and derivatives for food, medicine, and as a status symbol. Unabated human population growth and deforestation only add to the problem. More recently, an emerging Chinese middle class has demonstrated a willingness to pay exorbitant prices for pangolins, making it hugely profitable for poachers to source from other parts of Southeast Asia and as far away as Africa, resulting in intercontinental smuggling.

This Petition shows that the best available science and data unequivocally indicate all seven unlisted pangolin species meet the statutory requirements for listing as Endangered under the ESA. By listing these species as Endangered, the U.S. can end its role in the pangolin trade for

commercial purposes, while also increasing domestic and global awareness about the plight of pangolins.

I. INTRODUCTION

With their scaly bodies and long tongues, pangolins are one of the most distinctive mammals in the wild today. They are also one of the most imperiled species due to unprecedented international and domestic overexploitation and trade. With estimates as high as 1 million animals in the last decade alone, pangolins are the most illegally trafficked wild mammal in the world, passing iconic species such as the elephant and rhino. In much of China and Southeast Asia, pangolins have been driven to the brink of extinction by increasing demand from China and Viet Nam, where pangolin meat is a delicacy and their scales are believed to have healing powers. In Africa, pangolins are already the subject of domestic overuse as their meat is a favored bushmeat and many of their parts are essential for traditional medicine. As Asian pangolin populations have declined, international trade in African pangolins has ramped up, placing even more pressure on these already imperiled animals.

As a significant importer of pangolin parts, and as a global leader in conservation, the U.S. can make a large impact on the international trade of the species by ensuring that imports of – and interstate commerce in – pangolins and pangolin parts is prohibited unless such activity actually promotes the conservation of the species. An Endangered listing will help reduce demand for wild pangolins by reducing imports into the U.S. while also bringing national and global attention to the plight of these unique and amazing species. All pangolin species meet the definitions of Endangered under the ESA, and in order for the USFWS to meet its statutory duty to promote conservation of endangered species, it must list the seven currently unlisted pangolins species as Endangered.

II. STATUS AND DISTRIBUTION

A. Status and Distribution

The eight species of pangolin are distributed throughout tropical Asia (four species) and sub-Saharan Africa (four species). The Asian species consist of the Chinese pangolin (*Manis pentadactyla*), Sunda pangolin (*M. javanica*), Philippine pangolin (*M. culionensis*), and Indian pangolin (*M. crassicaudata*). The tree pangolin (*M. tricuspis*), giant ground pangolin (*M. gigantea*), long-tailed pangolin (*M. tetradactyla*), and Temminck's ground pangolin (*M. temminckii*) reside in Africa.

All eight species are listed in Appendix II of the Convention on International Trade of Endangered Species (CITES), the international treaty responsible for regulating international trade of imperiled species. The four Asian species have had a zero export quota for wild-caught animals for commercial purposes since 2000, significantly restricting legal international trade. In addition, Temminck's ground pangolin (*M. temminckii*) is listed as Endangered under the Endangered Species Act (USFWS, 1976).

While very few pangolin population estimates exist due to the species' elusive and nocturnal behavior, the best available science indicates that, despite the protection afforded by CITES and various other national and international statutes, all eight species are in serious decline (Boakye et al., 2014; Zhou et al., 2014; Soewu & Sodiende, 2015; Challender et al., 2014c). The International Union for the Conservation of Nature's (IUCN) Species Survival Commission has placed all eight species on their "Red List of Threatened Species," which is a repository for the conservation status of globally threatened species (IUCN, 2014). In 2013, the IUCN updated their assessment for all eight species and declared two to be Critically Endangered (*M. pentadactyla* and *M. javanica*), two to be Endangered (*M. culionensis* and *M. crassicaudata*), and four to be Vulnerable (all four African species).

B. Species Specific Range, Population, and Trends

a. *Manis crassicaudata* (Indian, or Thick-Tailed Pangolin)

Range

M. crassicaudata, or the Indian pangolin, can currently be found throughout peninsular India into West Bengal (India), southwest China, Sri Lanka, Nepal, and Pakistan (Israel et al., 1987; Prater, 1980; Schlitter, 1993). The Indian pangolin is the only pangolin species found in Pakistan, and even then, it is located in just a few discrete areas such as the Potohar Plateau in the Punjab Province (Roberts, 1997). Additionally, this species has been reported in Myanmar, but those sightings have yet to be confirmed (Baillie et al., 2014). In the mid-1980s, this species was described as occurring but rare in Bangladesh (Baillie et al., 2014). Even though the 2008 IUCN assessment also indicated the species occurred in extremely low numbers in this area, Heath (1995) suggested it has been completely extirpated throughout Bangladesh.

Population and Trends

A study recently conducted in the Potohar Plateau, Punjab Province, Pakistan, found the Indian pangolin to be in considerable population decline due to significantly increased levels of poaching and hunting for its meat and scales (Baillie et al., 2014). Consequently, this species is listed as Endangered on the IUCN Red List of Threatened Species, and unless the threats are adequately addressed, it is expected that this species will further decline by at least 50% within the next 21 years or over three generations (generation length for pangolins is approximately 7 years) (Baillie et al., 2014). Similar drastic declines have already been observed in *M. pentadactyla* (Chinese pangolin) and *M. javanica* (Sunda pangolin) over the last decade (Baillie et al., 2014).

b. *Manis pentadactyla* (Chinese Pangolin)

Range

M. pentadactyla, or the Chinese pangolin, is currently distributed throughout the Himalayan foothills, northern India, southern Bhutan, northeastern Bangladesh, northern Lao PDR, southern China, Taiwan, Hong Kong SAR, northern Viet Nam, northwest Thailand, and northern and western Myanmar (Challender et al., 2014a). It is believed to be extinct in certain parts of its historic range due to high levels of exploitation and illegal trafficking (Challender et al., 2014a).

Population and Trends

The status of the Chinese pangolin in Bangladesh, Bhutan, Myanmar, and Thailand is unknown (Challender et al., 2014a). This species is decreasing at an alarming rate due to high levels of poaching and unfortunately has become locally extinct within much of its original range throughout China due to extreme overexploitation over the last 21 years, or three pangolin generations (Challender et al., 2014a). Hence, the Chinese pangolin is currently listed as Critically Endangered on the IUCN Red List of Threatened Species, the gravest categorization given by the IUCN (Challender et al., 2014a). If these current levels of poaching continue unabated, it is estimated the Chinese pangolin will continue to decline up to 90% over the next 21 years (Challender et al., 2014a).

Historically, three pangolin species—*M. pentadactyla*, *M. javanica*, and *M. crassicaudata*—occupied China; however, they all became commercially extinct around 1995—meaning the populations are so low that they are nearly impossible to find (Challender et al., 2014a). Because the Chinese pangolin is reported as commercially extinct in China—indicating it is either completely extinct within the country or only exists in very low numbers—domestic demand is now being met through foreign imports from Southeast Asia (Challender et al., 2014a). Furthermore, the Chinese pangolin subspecies occurring in Taiwan, *M. pentadactyla pentadactyla* (Formosan pangolin), has been decreasing since the late 1980s, largely due to poaching, and is therefore considered extremely rare (Challender et al., 2014a).

c. *Manis javanica* (Sunda Pangolin)

Range

M. javanica, or the Sunda pangolin, is widely distributed across tropical Southeast Asia from Myanmar to Indonesia (Challender et al., 2014b). Specifically, it is widely distributed across the Malaysian peninsula (including Sarawak), throughout Indonesia on Sumatra, Java, Borneo (including Brunei), Kiau, the Lingga archipelago, Bangka and Belitung, the Nias and Pagi Islands, and Bali and the adjacent islands (Challender et al., 2014b). This species has been eradicated from lowland areas due to human agricultural expansion in southern Myanmar, and is becoming extremely rare throughout Thailand due to the resulting habitat loss (Challender et al., 2014b).

Population and Trends

Due to the fact that this species is nocturnal, elusive, and extremely rare, information regarding past and current population levels is scarce (Challender et al., 2014b). However, due to well-cited documentation of intense poaching for its meat and scales, the Sunda pangolin is listed as Critically Endangered on the IUCN Red List of Threatened Species (Challender et al., 2014b). Unless poaching levels decrease rapidly and dramatically, the Sunda pangolin is projected to decline a further 80% over the next 21 years (Challender et al., 2014b).

d. *Manis culionensis* (Philippine Pangolin)

Range

M. culionensis, or the Philippine pangolin, is endemic to the Philippines, and is found primarily in the northern and central regions of Palawan Island (Lagrada et al., 2014). In addition to

Palawan Island, this species occupies the following adjacent islands: Busuanga Island, Coron Island, Culion Island, and Dumaran Island (Lagrada et al., 2014).

Population and Trends

Due to its mysterious and nocturnal nature, the exact number of *M. culionensis* is currently unknown (Lagrada et al., 2014). However, it is clear the species is experiencing significant population declines throughout its range due to unsustainable exploitation for the illegal, international trade (Schoppe & Cruz, 2009). Indeed, the Philippine pangolin is currently listed as Endangered on the IUCN Red List of Threatened Species due to a suspected population decline of over 50% within the last 21 years (Lagrada et al., 2014). This is due not only to the aforementioned national and illegal international trade, but also subsistence hunting, and habitat loss (Lagrada et al., 2014). Considering the Philippine pangolin habitat is limited to a few, small islands, this drastic population decline is even more alarming (Lagrada et al., 2014).

e. *Manis tricuspis* (Tree Pangolin)

Range

The tree pangolin is distributed mostly throughout tropical regions Africa, primarily in Central and West Africa (Akpona et al., 2008). Its range extends from Guinea through West and Central Africa to as far east as Kenya and as far south as the northern reaches of Zambia and Angola (Waterman et al., 2014a). Its range countries include Angola, Benin, Cameroon, Central African Republic, Congo, Democratic Republic of Congo, Equatorial Guinea, Ivory Coast, Gabon, Ghana, Guinea, Kenya, Liberia, Nigeria, Rwanda, Sierra Leone, South Sudan, Tanzania, Togo, Uganda, and Zambia (Waterman et al., 2014a).

Population and Trends

Comprehensive population assessments do not exist for the species (Akpona et al., 2008), but the tree pangolin is considered to be the most common of the four African pangolins species (Sodiende & Adedipe, 1994; Soewu & Ayodele, 2009). The species used to be commonly found in roadside and town markets for sale and widely consumed in both rural and urban areas throughout its range (Akpona et al., 2008). More recent data suggest that the species' population is trending downward due to increased hunting pressure (Baker, 2014). Surveys of hunters and traditional medicine practitioners have found that the availability and size of tree pangolins have dropped precipitously (Soewu & Adekanola, 2011). The 2014 IUCN assessment of the species concluded that this species' status is Vulnerable and is in decline due to overhunting and increased pressure from intercontinental demand (Waterman et al., 2014a).

f. *Manis gigantea* (Giant Pangolin)

Range

The giant pangolin is distributed intermittently throughout tropical regions of Africa, primarily in Central and West Africa (Kingdon & Hoffman, 2013). Its known range in West Africa extends from Senegal east to Ghana along the humid forests of the coast. In Central Africa (and small parts of East Africa), the giant pangolins range extends from Cameroon, Gabon, and Congo on the west coast through the Democratic Republic of Congo and into Uganda (Waterman et al., 2014b; Kingdon & Hoffman, 2013). Its range countries include Cameroon, Central African

Republic, Congo, Democratic Republic of Congo, Ivory Coast, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Liberia, Senegal, Sierra Leone, Tanzania, and Uganda (Waterman et al., 2014b).

Population and Trends

There are no population estimates of the giant pangolin, but it is considered rare and hard to find (Sodiende & Adedipe, 1994; Brautigam et al., 1994), especially in Nigeria where it may have been locally extirpated (Akpona et al., 2008). The giant pangolin is found in bushmeat markets, but at a much lower rate than the tree pangolin (Brautigam et al., 1994; Fa et al., 2006; Kingdon & Hoffman, 2013; Fa et al., 2005).

The species is thought to be declining throughout its range, and extirpated from several areas including Rwanda, Niger, and Nigeria (Brautigam et al., 1994; Akpona et al., 2008). A 2014 IUCN assessment declared that this species' status is Vulnerable and it is in decline due to overhunting and increased pressure from intercontinental demand (Waterman et al., 2014b).

g. *Manis tetradactyla* (Long-tailed Pangolin)

Range

The long-tailed pangolin is distributed intermittently throughout the tropical regions of Central and West Africa (Waterman et al., 2014c). Its known range in West Africa extends from Sierra Leone east to Ghana along the humid forests of the coast (Waterman et al., 2014c). In Central Africa, the long-tailed pangolin is found in southern Nigeria and east through Cameroon, Gabon, and the Congo Basin. Its range countries include Cameroon, Central African Republic, Congo, Democratic Republic of Congo, Ivory Coast, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, and Sierra Leone (Waterman et al., 2014c).

Population and Trends

The long-tailed pangolin is the rarest of the three forest-dwelling African pangolins (Baker, 2014). There are no published population estimates, but the species is known to have especially low population densities as evidenced by low encounter rates, surveys of local people, and bushmeat market data (Fa et al., 2005; Baker, 2014). Population density is much lower than the tree pangolin, which inhabits a similar geographic location and ecological niche (Sodiende & Adedipe, 1994; Baker, 2014). Comprehensive surveys of hunters, traditional medicine practitioners, and bushmeat markets found evidence of tree pangolins and giant pangolins, but very few long-tailed pangolins (Fa et al., 2006; Akpona et al., 2008; Soewu & Ayodele, 2009; Soewu & Adekanola, 2011). A 2014 IUCN assessment declared that this species' status is Vulnerable and in decline (Waterman et al., 2014c).

III. NATURAL HISTORY AND BIOLOGY

A. Taxonomy

Pangolins constitute a unique and relatively isolated phylogeny. The eight extant species of pangolin all belong to the *Manis* genus, which is the only genus in the family Manidae, which is

the only family in the order Pholidata (Gaudin et al., 2009). Genetic evidence suggests that Pholidota split from the next closest order, Carnivora (which includes cats, dogs, bears, seals, and other carnivores) around 87 million years ago (Du Toit et al., 2014).

Four species can be found in the southern and eastern tropical regions of Asia (*Manis pentadactyla*, *M. culionensis*, *M. javanica*, *M. crassicaudata*), and four species are found in sub-Saharan Africa (*M. tricuspis*, *M. tetradactyla*, *M. gigantea*, and *M. temminckii*). It is estimated that the Asian and African species shared a common ancestor as recently as 47 million years ago (Du Toit et al., 2014).

Previous studies have assigned the eight species to varying numbers of genera based on different characteristics including continent (two genera), habitat type (three genera), and morphology (four to six genera) (Gaudin et al., 2009). The IUCN Red List of Threatened Species uses three genera (*Manis* for Asian species, *Phatiganus* for tree-dwelling African species, and *Smutsia* for ground-dwelling African species) following the Gaudin et al. study (Gaudin et al., 2009; IUCN, 2014). This petition will follow the single genus configuration that includes all eight species in *Manis* that is followed by CITES. Previous taxonomic iterations defined only seven species, but recent data confirmed that the Phillipine pangolin (*M. culionensis*) is a fully separate species, and not just a subspecies of the Sunda pangolin (*M. javanica*) (Gaubert & Antunes, 2005).

The pangolin's fossil record is relatively sparse due to the species' lack of teeth and affinity for forested habitat which tends to have poor conditions for fossilization (Gaudin et al., 2006). But, the fossil record indicates a much wider past distribution than at present. The oldest known pangolin ancestor fossil, called *Eomanis*, was found in Europe and dates back 45 million years ago. *Patriomanis americana* is the only ancestor in which fossils were found in the Western hemisphere, dating back 34 to 36 million years ago. More recent and fragmented fossil records are found in and around their current ranges in Africa and Asia (Gaudin et al., 2006). The fossil records indicate that the pangolin's ancestors first evolved on the supercontinent Laurasia and then migrated to Africa and Asia.

B. Morphology, Behavior, and Reproduction

Morphology

Pangolins are small mammals that are identifiable by rows of overlapping scales made of keratin that cover everything except their footpads, inner limbs, and the ventral side of their heads and trunk (Heath, 1992a). The scales, which are extremely durable and have sharp edges, offer protection from predators and vary in number, pattern, and size based on species and age (Heath, 1992b). The scales extend from the body when the pangolin curls into a ball, producing a barrier of razor-sharp edges. The scales make up between 20 to 30 percent of the body weight of the animal depending on species and age (Tikki Hollywood Trust, 2015). Pangolins have numerous morphological adaptations that allow them to harvest ants and termites effectively including the absence of teeth; a small, conical head; a long, sticky tongue; and a strong, muscular stomach for breaking down prey (Heath, 1992b). The tongue can be double the length of the body, extending into the abdominal cavity, which is unlike any other mammal (Chan, 1995). Pangolins have thick eyelids to protect their eyes from swarming insects while they feed. Pangolins also feature a

well-developed olfactory system and strong claws that are used to tear apart ant and termite nests (Heath, 1992b).

Behavior

Pangolins are elusive in nature as well as primarily nocturnal (Brautigam et al., 1994). They feed exclusively on ants and termites, typically by using sharp foreclaws to break open colonies and darting their sticky tongues in and out of the passageways (Kingdon & Hoffman, 2013). Pangolins are voracious eaters and act as an important regulator of ant and termite populations. It is estimated that a single adult individual consumes more than 70 million insects in one year (Soewu & Sodiende, 2015). They sleep in ground burrows or tree hollows, emerging at night to forage for prey. Pangolins are capable of both bipedal and quadrupedal walking and running (Heath, 1992b). When threatened, the pangolin will curl into a tight, impenetrable ball, protecting the belly, snout, and foot pads which are the only parts of the animal not covered in scales (Heath, 1992a). This defensive behavior is extremely effective against large carnivores such as lions and hyenas, who will attempt to penetrate the curled form for some time and then eventually give up, allowing the pangolin to walk away unscathed (Coniff, 2013). It should be noted that this defensive strategy makes them particularly vulnerable to human exploitation because they can be easily picked up and placed in a bag (Zhou et al., 2014). Pangolins can also spray odorous secretions from glands in their anus to deter predators (Soewu & Ayodele, 2009). Mature pangolins are solitary, and will only seek out other conspecifics to mate (Brautigam et al., 1994).

Reproduction

Pangolins mate once per year (Heath, 1992b, Chin et al., 2012). They are not monogamous and will mate with different partners throughout their lifetimes (Heath & Coulson, 1997). Males will find females near their home ranges to initiate copulation. Gestation period is different based on species, but it ranges between 120 and 150 days (Soewu & Ayodele, 2009). Birth events produce only one offspring (Heath, 1992b; Zhou et al., 2014). After birth, females will nurse their young and carry them around on their tails or backs while foraging until maturation (Heath, 1992b). Pangolins generally require one to two years to attain sexual maturity (Soewu & Adekanola, 2011).

C. Species Specific Habitat Requirements and Other Characteristics

a. *Manis crassicaudata* (Indian Pangolin)

M. crassicaudata occurs in various types of tropical forests, grasslands, plains, and lower slopes (Baillie et al., 2014). This species is able to adapt to many varying terrains as long as prey is abundant (Baillie et al., 2014). In Sri Lanka, for example, Indian pangolins live in the rainforest canopy where flowers and fruits occur—and thus ants—instead of at ground level where food is scarce (Israel et al., 1987). Indeed, even though Indian pangolins are considered to be primarily ground-dwelling, they might become arboreal in certain habitats and in pursuit of prey (Heath, 1995; Prater, 1980). Indian pangolins are agile climbers, using their limbs to grip the tree and their tails for support while climbing up the trunk (Prater, 1980).

The Indian pangolin will dig both feeding burrows as well as temporary and permanent living burrows; living burrows differ from feeding burrows by being both deeper and more circular (Mahmood et al., 2013). As this species is solitary and nocturnal, *M. crassicaudata* generally sleeps in living burrows during the day, and covers the entrance with soil to keep it closed (Heath, 1995). Living burrow depth ranges from 2 meters (6.56 feet) in rocky soil to 6 meters (19.68 feet) in loose soil (Prater, 1980). Every few months, the Indian pangolin moves to a new area and digs a new living burrow close to prey, such as termite nests (Mahmood et al., 2013).

M. crassicaudata is insectivorous and subsists on two ant species, *Camponotus confucii* and *Camponotus compressus*, and the termite species, *Odontotermis obesus* (Roberts, 1997; Mahmood et al., 2013). The Indian pangolin, like all pangolin species, catches its prey by using its sticky tongue to catch ants, termites, and their eggs (Roberts, 1997; Prater, 1980). This species eats both eggs and young and adult insects, but is selective in terms of prey type (Prater, 1980). For instance, there is some evidence that this species has a preference for eggs over adults (Mahmood et al., 2013). Pangolins will drink water when it is available; however, they can exist without water for long periods of time if necessary (Prater, 1980).

b. *Manis pentadactyla* (Chinese Pangolin)

Chinese pangolins are predominantly a ground-dwelling species, and can occupy many forest ecosystems, including primary and secondary tropical forests, as well as limestone, bamboo, and broad-leaf and coniferous forests (Heath 1992a; Challender et al., 2014a). Additionally, this species can be found in grasslands and agricultural fields throughout their range (Challender et al., 2014a).

In addition to human-induced threats, the Chinese pangolin is imperiled due to its food specializations, low reproductive rate, and strict habitat requirements (Challender et al., 2014c). Chinese pangolins spend winters in deep burrows they dig themselves; these shelters provide a stable temperature and consistent sources of food such as termite nests (Challender et al., 2014a). This solitary and nocturnal species rests in burrows during the day, leaving in the evenings to forage (Heath, 1992a). Chinese pangolins will usually walk slowly on all four legs, but will walk bipedally in order to move faster (Heath, 1992a). They are proficient at both swimming and climbing (Heath, 1992a)

The insectivorous *M. pentadactyla* will forage after sunset for black ants and termites (Heath, 1992a). Because of seasonal differences in prey distribution, the Chinese pangolin has evolved the ability to survive without food longer in the winter (Heath, 1992a). During the summer, Chinese pangolins are able to leave their burrows and move further distances across hillsides during the night (Heath, 1992a).

c. *Manis javanica* (Sunda Pangolin)

The predominantly arboreal *M. javanica* is found throughout the forests of Southeast Asia (Challender et al., 2014b). The Sunda pangolin largely occupies primary and secondary forest, which can include lowland dipterocarp forest and cultivated areas such as gardens and palm oil and rubber plantations (Challender et al., 2014b).

M. javanica is both ground and tree dwelling; they are skilled climbers and prefer to sleep in tree hollows, but have also been known to dig hollows in soil (Challender et al., 2014b). They are considered to be more arboreal than the other Asian pangolin species (Challender et al., 2014b). However, like the other Asian pangolin species, they are insectivorous, feeding solely on termites and ants (Challender et al., 2014b).

d. *Manis culionensis* (Philippine Pangolin)

The Philippine pangolin generally occupies primary and secondary lowland rainforests as well as scrublands, lowland grassland, and cultivated areas such as agricultural lands and even human settlements, provided there is sufficient cover (Schoppe & Cruz, 2009). Additionally, this species has been reported as having an affinity to fig trees (*Ficus* spp.), most likely because the trees provide hollows and attract insects (Lagrada et al., 2014).

e. *Manis tricuspis* (Tree Pangolin)

M. tricuspis requires closed-canopy, moist tropical forest such as dense woodlands, swampy woodlands, and secondary growth (Brautigam et al., 1994). This species is also known to inhabit older or abandoned tree plantations (Akpona et al., 2008). *M. tricuspis* is mostly tree dwelling. It will use its strong, prehensile tail to navigate through dense arboreal vegetation to forage for ant and termite prey (Robinson & Redford, 1994). *M. tricuspis* will also forage on the ground if prey is available (Akpona et al., 2008). When not foraging or looking for a mate, the animal finds shelter in tree holes, that they change every few days (Foley et al., 2014).

f. *Manis gigantea* (Giant Pangolin)

M. gigantea inhabits forests, and savannahs near forests, with good rainfall and high humidity without long dry seasons (Waterman et al., 2014b). They are completely dependent on water availability and do not occur in drier areas (Foley et al., 2014). *M. gigantea* are exclusively ground-dwelling, foraging for ants and termite nests on forest and savannah ground (Kingdon & Hoffman, 2013). *M. gigantea* are large and strong enough to penetrate the normally impervious structure built by termites and ants found on the ground (Swart et al., 1999). The species digs their own burrows, which can be up to 5 meters deep and 40 meters long, to sleep in during the day (Kingdon & Hoffman, 2013).

g. *Manis tetradactyla* (Long-tailed Pangolin)

M. tetradactyla is found in close-canopied, moist tropical forests such as dense woodlands, swampy woodlands, and secondary growth (Brautigam et al., 1994). *M. tetradactyla* is primarily arboreal, using its extremely long prehensile tail to navigate dense arboreal vegetation foraging for ant and termite nests at night (Kingdon & Hoffman, 2013). They are thought to sleep in tree hollows during the day (Akpona et al., 2008).

IV. CRITERIA FOR LISTING THE PANGOLIN AS ENDANGERED

According to the ESA, a species must be listed as Endangered if any of the following five factors put the species in danger of extinction throughout all or a significant portion of its range: (1) The present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or education purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or manmade factors affecting its existence. 16 U.S.C. § 1533(a)(1)(A)-(E); 50 C.F.R. § 424.11(c)(1) - (5). The U.S. Fish and Wildlife Service must make the determination “solely on the basis of the best scientific and commercial data available” *Id.* § 1533(b)(1)(A).

This Petition demonstrates that the best available scientific and commercial data unequivocally shows that the seven currently un-listed pangolin species are presently in danger of extinction throughout a significant portion of their range due to several of these factors. Under the ESA, the Secretary of the Interior must act to halt and reverse the current trends towards extinction for these species by listing the species as Endangered.

A. Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

a. Asian Species

Habitat loss and degradation due to expanding agriculture, commercial logging, forest fires, and deforestation have been established as the second largest threat to the continued existence of Asian pangolins behind the illegal trade for their meat and scales (Challender et al., 2012a). The loss of suitable pangolin habitat in Asia is most often and most intensely caused by deforestation, which leaves the species without cover or shelter for themselves or their offspring (Lim & Ng, 2008). A prime example of this can be found in Borneo, where deforestation occurs at one of the fastest rates in the world due to illegal logging, forest fires, and the wide-spread development of palm oil and rubber plantations (Pantel & Anak, 2010). Experts consider that the rapid loss of forest habitat in Borneo contributes significantly to the Sunda pangolin’s (*Manis javanica*) imperiled status. In India, large portions of the Indian pangolin’s (*M. crassicaudata*) range in have been destroyed due to human population increase and the resulting increase of agricultural development (Baillie et al., 2014). Additional side effects are increased irrigation and pesticide use, which also impacts this imperiled species (Baillie et al., 2014).

b. African Species

The loss of tropical forests due to resource extraction and human population expansion in Africa is a well-documented phenomenon (Duvellier et al., 2008; UNEP, 2007). In the rainforests of Central and West Africa, where the three unlisted African pangolin species are primarily found, deforestation has been occurring at elevated rates (Laurance et al., 2006). Furthermore, logging and oil extraction are widespread, contributing to the fragmentation of previously intact blocks of rainforest with roads and other construction (Thibault and Blaney, 2003; Poulsen et al., 2009). Population growth, which is expected to increase in Central and West Africa, only further exacerbates deforestation and fragmentation (UNEP, 2007).

It is clear that extensive loss of rainforest leads to the loss of habitat for an animal such as the pangolin that relies on closed forest canopy (Akpona et al., 2008). However, the degree to which

fragmentation specifically affects pangolins is unclear. Nevertheless, when combined with the primary threat of poaching, the loss of forest cover throughout their range is a significant threat to the three African forest-dwelling species.

B. Overutilization for Commercial, Recreational, or Scientific Purposes

a. Unsustainable use of Asian Species

Scope of the problem

Pangolins are among the most prevalent wild mammals in trade (Schoppe and Cruz, 2009). Commercial overutilization for their meat, scales, and other parts is the most severe threat to their existence (Challender et al., 2014a). Even though pangolins have various levels of protection throughout many of their range States and the world, unsustainable trade continues largely unabated as many of the laws put in place for their protection are weak and/or lack enforcement (Challender et al., 2012a; Burton, 2009).

Between 1980 and 1985, over 185,000 pangolin skins were legally exported from Asia, and 90% of those products were imported into the U.S. (Heath, 1995). This trade has only grown larger in more recent years, despite increased international regulation. Experts believe that the two most imperiled pangolin species, the Chinese pangolin (*M. pentadactyla*) and the Sunda pangolin (*M. javanica*), will go extinct within the next decade if the trend does not change (Challender et al., 2014a; Challender et al., 2014b).

In 2007, the estimated Chinese market value for this illicit trade was over US\$176 million annually, or US\$1,550 per pangolin (Pantel & Yun, 2009). However, the value has increased throughout Asia since that time: over the past five years, the value of one kilogram of pangolin scales has increased from \$260 to \$645—marking a price increase of 250% (Lin, 2014). As recent as July 2014, three tonnes (3,000 kg) of pangolin scales from Africa worth approximately US\$2.2 million were found hidden in shipping containers in Hong Kong (Lo, 2014); this equates to a value of US\$733.33 per kilogram. As the price of pangolins and their products increases, poaching levels also increase (Lin, 2014).

Although many countries in Southeast Asia are involved in the illicit trade of pangolins to some extent, China and Vietnam are the biggest offenders (Pantel & Anak, 2010). China, the main consumer country of pangolins and their parts, first drove their endemic pangolin species (*Manis pentadactyla*) to near-extinction in the 1990s (Nuwer, 2015; Challender et al., 2014c). This led to increased international trafficking from other Asian range countries such as Vietnam, Cambodia, and Lao PDR through a complex network of intermediaries and smugglers (Pantel & Anak, 2010). Vietnam, second only to China, plays many dominant roles in the overutilization of pangolin species, as an origin, transit, and consuming country (Newton et al., 2008). In other range States, sustainable local consumption has been supplanted by more persistent harvesting to meet demand in China and Vietnam (Challender et al., 2014a).

Traditional Medicine

Pangolin scales and other pangolin parts, such as their blood, are heavily traded in Asian markets for use in traditional Chinese medicine at levels far beyond what is sustainable (Zhou et al.,

2012). Despite a complete lack of scientific evidence to substantiate the alleged medicinal benefits of pangolin scales and their parts, they are used to treat a variety of ailments and conditions in countries like China and Vietnam (Challender et al, 2014c). This includes, but is not limited to: improving liver function, detoxifying and draining pus, relieving palsy, reducing swelling, stimulating blood circulation, and increasing both fertility and milk production for pregnant women (Li, 1982; Qiu, 1985; Gao, 2012). Pangolin scales from *Manis pentadactyla* (Chinese pangolins) are additionally prescribed for ailments such as cancer in hospitals and by traditional medicine retailers (Challender et al., 2014a). Furthermore, the Philippine pangolin (*M. culionensis*) is also used regionally for both its meat and its perceived medicinal value (Lagrada et al., 2014); in fact, some ethnic Taiwanese drink its blood mixed with wine because of its purported health benefits (Schoppe & Cruz, 2009).

Fashion

In addition to being used for traditional medicine, pangolin scales are used in jewelry and other fashion accessories, and their skins are also sometimes used to make leather boots and shoes (Newton et al., 2008). Due to rapid economic growth, pangolin products are increasingly in demand for these uses (Challender, 2011). Throughout the 1980s and 1990s, products derived from Sunda pangolins (*M. javanica*) were traded worldwide. The most popular destinations for these products were Japan, the U.S., and Mexico, where they were predominantly used for boots and shoes (Challender, 2011).

Meat

Asian pangolins are being eaten to extinction in China and Vietnam (Challender et al., 2012a). Like the increased trends in pangolin scales for jewelry, shoes, and fashion, the rising economies in these countries have also led to an increase of customers willing to pay high prices for pangolin meat (Challender, 2011). Consumers—eager to show off their wealth—demand wild pangolin meat, considered to be an exotic, luxurious delicacy (Newton et al., 2008; Challender et al., 2014a). According to Dan Challender, Co-Chair of the IUCN Pangolin Specialist Group, pangolin meat is often the most expensive item on the menu at restaurants in China and Vietnam, and is sought specifically as a way to boast of one's affluence to friends and colleagues (Nuwer, 2015). The fact that the trade and consumption of pangolins and their meat is largely illegal does not serve as a deterrent (Nuwer, 2015). As Challender stated, "The fact that it's illegal isn't played down and is even attractive, because it adds this element that you live beyond the law" (Nuwer, 2015).

b. Unsustainable use of African Species

Scope of the Problem

In the humid forest areas of West and Central Africa, wildlife species are hunted extensively in their natural habitat for meat and for traditional medicine and ritual purposes (Anadu et al., 1988; Fa et al., 2006; Bennet et al., 2006). Unfortunately, extraction by hunting is considered unsustainable and is thought to be a primary cause of biodiversity loss in tropical forests (Fa et al., 2002). Tropical forests maintain relatively low wildlife density compared to savannahs and so wildlife cannot produce as fast as extraction rates (Robinson & Bodmer, 1999; Fa et al., 2002). Recent studies have characterized a "bushmeat crisis" or "empty forest phenomenon" in West African tropical forests, and the potential for one in the Congo Basin caused primarily by

overhunting (Robinson & Bodmer, 1999; Bennet et al., 2006; Poulsen et al., 2009). Populations of many large-bodied wildlife species have already seen declines or have been extirpated while slower growing smaller species are threatened with local extinctions (Robinson & Bodmer, 1999; Bennet et al., 2006; Poulsen et al., 2009).

Population increase, resource extraction activities, and urbanization are leading to even more demand for wildlife and further hunting pressure on wildlife. In much of the forested regions of West and Central Africa, hunting has become a commercialized activity to satisfy the needs of a rapidly urbanizing population that still demands bushmeat (Anadu et al., 1988; Robinson & Bodmer, 1999; Soewu & Adekanola, 2011). Local subsistence has largely been replaced by trade as the primary motive for hunting, and is leading to more pressure on bushmeat species (Soewu & Sodiende, 2015). Furthermore, extraction activities such as oil drilling and logging have been increasing, driving up human population in forest regions and subsequent demand for wildlife (Bennet et al., 2006). Commercial activities also bring expanded road construction, which creates pathways for hunters to pangolin habitat that was previously protected by virtue of isolation and inaccessibility (Poulsen et al., 2009; Thibault & Blaney, 2003).

The three African pangolin species in this petition, the tree pangolin (*Manis tricuspis*), the giant pangolin (*M. gigantea*), and the long-tailed pangolin (*M. tetradactyla*), primarily reside in the humid forests of West and Central Africa and are highly susceptible to overhunting. Demand for their meat, parts, and derivatives is both consistent and pervasive, cutting across socio-economic, cultural, and geographic lines (Fa et al., 2005, Boakye et al., 2014). While there are no population estimates, rates of extraction are thought to be unsustainable in light of the biology and life history of the pangolin, while surveys of hunters and traditional medicine practitioners indicate that populations have seen significant and rapid declines (Soewu & Ayodele 2009; Soewu & Adekanola, 2011; Soewu & Sodiende, 2015). With projected increases in human population and resource extraction activities, demand will only rise and previously isolated pangolin populations will become accessible by hunters (Bennet et al., 2006).

Traditional Medicine

It is estimated that 80% of Africa's population depends on traditional medicine (Boakye et al., 2014), and pangolins are among the species that are most consistently used for traditional medicine throughout the continent (Brautigam et al., 1994). A wide variety of pangolin parts are used to treat an astonishing variety of ailments along a comprehensive geographical and cultural spectrum (Bryant, 2014). For example, a survey of traditional healers in the Ogun State in Nigeria found that pangolins or pangolin parts were used to treat a total of 47 conditions among the Awori people and 42 conditions among the Ijebus people (Soewu & Adekanola, 2011). Another survey of traditional healers in Sierra Leone found that 22 different pangolin body parts were used to cure 59 conditions, with scales being the most used (Boakye et al., 2014). In Central Africa, the pangolins consistently have symbolic and mystical value even among different cultures (Heusch et al., 1993), and are hunted for their scales and parts. In Ghana, scales are burned by some tribes to ward off evil spirits (Brautigam et al., 1994).

Because pangolins are considered so useful for such a wide range of illnesses among a variety of people, local demand for their parts is not sustainable, especially with growing human populations (Soewu & Sodiende, 2015). Furthermore, many of the conditions cured by pangolin

parts are “cultural ailments” which have no Western medicine equivalent and so they are unlikely to be replaced by Western style health care, even if they become available (Boakye et al., 2014). Surveys of traditional healers also indicate that many practitioners do not recognize that they are causing harm to the three species (Soewu & Ayodele, 2009; Soewu & Adekanola, 2011).

Bushmeat

Pangolins are some of the most desired bushmeat species in the communities in and around their ranges (Sodiende & Adedipe, 1994; Fa et al., 2006). Their meat consistently fetches high prices at bushmeat markets indicating high demand (Anadu et al., 1988; Brautigam et al., 1994, Fa et al., 2006). Pangolin meat is considered a delicacy or status symbol in many African cultures (Soewu & Sodiende, 2015).

Evidence of Overhunting

Assessments based on hunting rates, pangolin biology, surveys, and anecdotal evidence indicate that the extraction rates for pangolins are unsustainable (Boakye et al., 2014; Baker, 2014; Bennett et al., 2006; Soewu & Adekanola, 2011; Soewu & Sodiende, 2015). As early as 1994, hunters in Nigeria were reporting increasing difficulty of capture because of increased rarity (Sodiende & Adedipe, 1994). More recent surveys of hunters and traditional medicine practitioners in Nigeria show unequivocal evidence of reduced availability and size (Soewu & Ayodele, 2009; Soewu & Adekanola, 2011). In total, Soewu & Ayodele recorded the sale of 178 pangolins over four months in just four market towns in the Ogun State of Nigeria (Soewu & Ayodele, 2009). The authors consider these extraction rates to be unsustainable for a slow-growing and sparsely distributed species such as the pangolin (Soewu & Sodiende, 2015).

Conclusion

Uncontrolled and commercialized hunting is depleting many wildlife species in West and Central Africa. The three African pangolin species in this Petition, which primarily reside in West and Central Africa, are no exception, being hunted to satisfy the pervasive demand for their highly desirable meat and the many medicinal properties they are believed to have. Considering their sparse population density and slow reproduction rate, it is more than likely that these species are being hunted faster than they can produce. Furthermore, demand is likely only to increase as urban populations grow and extraction activities like logging bring the construction of roads to previously isolated habitats. Local human populations are either unaware of these issues or lack the will to impose or enforce sustainability measures (Soewu & Sodiende, 2015). Unless hunting pressure is tempered, it is likely to result in the loss of populations, local extirpations, or even extinctions across their range.

c. International Trade

One of the primary threats to pangolins is the growing international, including intercontinental, trade in pangolins and their parts. As discussed in previous sections, demand for pangolin products is soaring in China, fuelled by rapid economic growth and a surge in affluent customers (Zhou et al., 2014). As pangolin populations have fallen in China, dealers are looking to countries in Southeast Asia, the Indian subcontinent, and Africa to satisfy this demand (Burton 2009, Challender & Hywood, 2012). This Petition estimates the legal and illegal international

trade in pangolins and their derivatives using official databases and public reports. Original analysis of CITES trade data for legally traded pangolins and their products between 2004 and 2013 (the most recent years for which complete data is available), presented in this Petition found legal trade in the amount of approximately 11,268 individuals during this period. However, data of the illegal trade obtained through original analysis of reported seizures of pangolins and their parts during the same time period indicates the immense scale of overutilization through the illegal international trade, with an estimated 930,370 pangolins traded illegally during this period. This estimate was calculated by extrapolating seizure quantity data from publically available seizure reports using the INTERPOL rule of thumb that estimates that only about 10% of actual total illegal trade levels are evident from seizures (Christy, 2012). This indicates the massive scale of the illicit trade in pangolins and their products despite CITES regulations, including a zero export quota for the international trade in wild specimens of Asian pangolin species for commercial species, and national regulations restricting trade in pangolins.

In addition, the original analysis of legal trade data in both CITES trade data and LEMIS data indicates the major role that the U.S. plays as a destination for the illicit trade in pangolin derivatives and medicines, with 26,696 net exports (or approximately 95% of the global net exports) listed in CITES trade data as having been imported into the U.S. between 2004 and 2013 (See Table B1 and B2 in Annex). Of these, 99.9% were seized as illegal. If these figures likewise represent only 10% of the actual illegal trade volume, as many as 240,264 pangolin derivative or medicine products may have been smuggled into the U.S. between 2004 and 2013.

By listing the remaining unlisted seven pangolin species as Endangered under the Endangered Species Act, the U.S. could have a significant and positive impact on the global effort to bring the genus back from the brink of extinction.

- i. International Legal Trade in Pangolins and Their Parts

1. Methodology and Preliminary Comments

- a. CITES database

This section of the petition presents original analysis of data on the legal trade in pangolin parts. Raw net and gross import and export data was obtained from the CITES Trade Database on February 16th and 18th, 2015, and May 8th, 2015.

It must be noted that the CITES Trade Database has several limitations. First, the database includes data reported by CITES member states (Parties) which, for various reasons, may not always be accurate. For example, it is often the case that importing and exporting countries international trade figures do not match, even though they refer to the same specimens in trade. Second, the data cannot be used to determine the extent of the illegal trade because illegal trade is, by its very nature, not recorded; the exception is specimens that are seized, which may be recorded by Parties in their CITES Annual Report.

Third, while the analysis presented below primarily focuses on the ten year timespan between 2004 and 2013, the pangolin products traded during that time, as reflected in the CITES

database, may not have been sourced from pangolins that died naturally or were killed in that same time period. Specimens in trade may have been sourced from stockpiles of these products that were taken from pangolins killed or that died during different time periods. The CITES database does not provide information on the age of the traded specimen.

Fourth, when collecting CITES database information, one must select between gross exports, gross imports, net exports or net imports. According to CITES, net trade “first calculates a country’s gross (re-)exports and gross imports, and then gives the positive difference between the two values” and “aims to give an estimate of the actual number of items being traded” (CITES, 2011). However, when researching trade data into or from a specific country, only gross trade can be calculated. According to CITES, in gross trade, “quantities reported by the exporter and importer are compared and the larger quantity is presented in the output. This type of output aims to give an estimate of the total number of items recorded in international trade” (CITES, 2013). In this petition analysis, net imports are calculated for all cases, except with respect to data on international trade by a specific source country, in which case gross imports are calculated. As CITES explains, “if your data selection only involves imports to, or exports from, specified countries, you cannot calculate net imports or exports, as not all the data necessary for the calculation will be available.”

Finally, the database presents trade data with and without units of measurement (i.e., kilograms, grams, milliliters, etc.), complicating the calculation to estimate the number of pangolins whose parts are in international trade. Some data are presented in terms of numbers, medicines, and other terms, which give no indication as to weight or size of the specimens. For example, the U.S. may report that 10 pangolin “medicines” were imported during a certain year, but it does not indicate the weight or volume of the medicines in question. It is therefore difficult to ascertain how many individual pangolins are represented by the CITES data where weight information is not provided, and therefore, this does not fall into the categories described below. These data are, however, important in ascertaining the nature of the market for pangolins and their products.

b. Extrapolating the Number of Pangolins from Trade Data

In order to calculate the number of pangolins reflected by specimens of scales traded, this analysis utilizes different formulae, depending on the pangolin species, based on the weight of scales of the different species in this Petition.

Research into the allometry of the scales of two pangolin species indicates that the conversion standards between dry weight of scales and number of individuals is 0.57 kg in *M. pentadactyla* and 0.36 kg in *M. javanica* respectively, and when the two are mixed together, average above two parameters of the median at 0.47 kg (Zhou et al., 2012). The average scale weight of *M. crassicaudata* individual are estimated at 1.90 kg, while average total scale weight of *M. culionensis* can be estimated to be about 0.41 kg (both calculated from 20% of the average total weight of the species, respectively).

Research indicates that the mean dry scale weight conversion standard for African species is an average of 1.94 kg per pangolin (Calculation: 0.60 kg for *M. tricuspis* + 0.66 kg for *M.*

tetradactyla + 2.90 kg for *M. temminckii* + 3.60 kg for *M. gigantea* = $7.76 \div 4 = 1.94$ kg of dry scales on average per individual African pangolin) (Tikki Hywood Trust, 2015).

As it is exceedingly difficult even for experts to visually identify individual scales at the species level, and because many of the entries for pangolins and their products are identified only as *Manis* spp., a more general conversion standard can be extrapolated from the mean dry weight of scales of all species of pangolin for which such data is available. The mean dry scale conversion standard can be calculated as follows: $0.47 \text{ kg } (M. javanica \text{ mixed with } M. pentadactyla) + 1.90 \text{ kg } (M. crassicaudata) + 0.41 \text{ kg } (M. culionensis) \div 3 = \text{an estimated } 0.93 \text{ kg per individual for all Asian species. } 0.93 \text{ kg} + 1.94 \text{ kg, the mean dry scale conversion ratio for all African species (Tikki Hywood Trust, 2015) = } 2.87 \text{ kg} \div 2 = 1.44 \text{ kg of dry scales per pangolin of all species for which conversion standard data is available.}$

CITES Trade Database entries classified as ‘BOD’ (bodies), ‘LIV’ (live), ‘SKI’ (skins), and ‘TRO’ (trophies) represent one individual of a given species, and so each such entry for pangolin species can be seen as representing the corresponding number of individuals.

For entries of “scales” for which a weight is provided, the aforementioned formulae can be utilized to estimate the number of individual pangolins represented by the scales.

2. CITES and Trade Data of Pangolins and their Parts

Data for legal trade in pangolins and their parts for the last ten years available (2004-2013) was obtained on February 16th and 18th, 2015, and original analysis was subsequently conducted to obtain an estimate of the number of pangolins legally traded over that period. According to CITES trade data, a total of about 11,198 individual pangolins were traded between 2004 and 2013, including specific data for imports and exports of *M. pentadactyla*, *M. tetradactyla*, *M. javanica*, *M. gigantea*, and *M. tricuspis*, but there were also a significant amount of imports and exports reported as *Manis* spp.

There was a discrepancy of 278 pangolins between net export and net import data of pangolins and their products representing individual pangolins in the CITES trade database, so the total figure above was reached by finding the average of total net import and net exports as described below.

While the original analysis did study imports of pangolins and their parts from individual range States, the data are so sparse that net global trade figures were used for the main analyses, as they represent the overwhelming majority of the legal trade through CITES.

Illegal trade in pangolins and their parts is discussed separately below.

a. Global Net Exports of Pangolins and their Products from All Sources and for All Purposes

Net exports of 3,105 products that each represent an individual pangolin were reported in the CITES trade data between 2004 and 2013, and 3,696 kg of net exports of pangolin products were

recorded between 2004 and 2013, which equates to roughly 8,232 individual pangolins (calculations in section ii. below). Together, total net exports of an estimated 11,337 pangolins were reported in CITES trade data during this period.

Based on the data obtained from the CITES trade database, seven countries were found to play a significant role in the export of pangolins and their products: Togo, Lao PDR, Guinea, the U.S. and Thailand each play a role in exports of pangolins and their products that each represent an individual (i.e. bodies, live animals, skins, and trophies); Singapore and Togo both play a major role in the export of pangolins and their products reported in kilogram units (e.g. scales); while Viet Nam and China are the principal exporters of pangolin products described as “medicines” or “derivatives.” The U.S. acts as a transshipment point, importing pangolins and their products from range State countries and re-exporting them to consumer nations, as evidenced by the exports to Mexico in 2013 mentioned below.

i. Global Net Exports of Pangolin Products that Each Represent an Individual Pangolin (bodies, live, skins, trophies)

According to CITES trade data of pangolins and their products that equate to whole individuals (bodies, live pangolins, skins and trophies), net exports of products representing a total of 3,105 pangolins were reported as being in trade between 2004 and 2013 (See Table A1 below).

Togo stands out as the principal exporter of pangolins and their products that each represent an individual, of which 1,321 net exports were reported between 2004 and 2013. This number comprises 43% of the total global net exports of pangolins and their products in this period. Togo is the largest exporter of live pangolins according to this data, having exported 1,086 live specimens, including all three African species not listed under the ESA in the period studied, comprising 95% of all live pangolin exports during this span. Also of note is the export of 500 live individuals of *M. tricuspis* from Togo to Italy in 2008, which were marked as being sourced from a ranching operation (see Table A2 in Annex), despite evidence that captive breeding operations have been largely unsuccessful (Yang et al., 2007). This indicates the possibility of falsified sourcing information. Furthermore, 235 pangolin skins were exported from Togo during that same period.

Second in terms of total number of individuals exported is Lao PDR, from which a total of 1,003 products that equate to individual pangolins were exported between 2004 and 2013. This number comprises 32% of the total global net exports of pangolins and their products in this period. 1,000 *M. pentadactyla* skins were exported to Mexico in 2010 and again marked as having been sourced from a ranching operation (see Table A1 in Annex), despite evidence that captive breeding operations have been largely unsuccessful (Yang et al., 2007). This raises concerns that CITES documentation was falsified to circumvent the zero-export quota for this species.

Guinea exported 250 *M. tricuspis* skins to Thailand in 2011 for commercial purposes, which alone comprises approximately 8% of the total global net exports of pangolins and their products between 2004 and 2013. The U.S. re-exported 225 *M. gigantea* skins from Togo to Mexico in 2013 for commercial purposes, while Thailand exported 210 pangolin skins to the U.S. between

2011 and 2013 (see Table A1) for commercial purposes, each comprising approximately 7% of the total global net exports of pangolins and their products between 2004 and 2013. It is worth noting that nearly half of the exports from Thailand were seized as illegal specimens.

Table A1: Global Net Exports of Pangolin Products that Each Represent an Individual Pangolin (bodies, live, skins, trophies), 2004-2013

Taxon	Term	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
Manis tricuspis	live	BJ	0	0	0	0	0	0	2	2	0	0	4
Manis pentadactyla	bodies	CA	0	0	0	0	0	0	0	1	0	0	1
Manis tricuspis	skins	CG	0	0	0	0	0	0	0	1	0	0	1
Manis spp.	skins	CH	0	0	0	0	2	0	0	0	0	0	2
Manis spp.	skins	CI	0	0	0	0	0	0	1	0	0	0	1
Manis tetradactyla	skins	CM	0	0	0	0	0	0	0	2	0	0	2
Manis tricuspis	live	CM	0	0	0	20	0	4	0	0	0	0	24
Manis tricuspis	skins	CM	0	0	0	0	0	0	0	6	0	0	6
Manis pentadactyla	live	CN	2	0	0	0	0	0	0	0	0	0	2
Manis gigantea	bodies	GA	1	0	0	0	0	0	0	0	0	0	1
Manis tricuspis	live	GA	0	0	2	0	0	0	0	0	0	0	2
Manis spp.	bodies	GH	0	0	0	1	0	0	0	0	0	0	1
Manis tricuspis	skins	GN	0	0	0	0	0	0	0	250	0	0	250

Manis spp.	bodies	GQ	0	0	0	0	0	0	0	0	0	1	0	1
Manis javanica	bodies	KH	0	0	0	0	0	0	0	0	0	6	0	6
Manis spp.	skins	KW	0	0	0	0	2	0	0	0	0	0	0	2
Manis javanica	skins	LA	0	0	1	0	0	0	0	0	0	0	0	1
Manis pentadactyla	skins	LA	0	0	0	0	0	0	1000	0	0	0	0	1000
Manis spp.	bodies	LA	0	1	0	0	0	0	0	0	1	0	0	2
Manis gigantea	trophies	LR	0	0	0	0	0	0	0	0	0	0	1	1
Manis javanica	bodies	MY	0	0	0	0	0	0	0	0	1	1	0	2
Manis javanica	live	MY	0	0	0	0	0	0	0	0	0	0	11	11
Manis spp.	bodies	NG	0	0	0	0	1	0	0	0	0	0	0	1
Manis tricuspis	live	NG	0	0	0	0	0	10	0	0	0	0	0	10
Manis spp.	bodies	NZ	0	0	0	0	0	0	0	0	0	0	1	1
Manis spp.	skins	PH	0	1	0	0	0	0	0	0	0	0	0	1
Manis gigantea	live	TG	0	0	0	0	0	0	0	0	10	58	0	68
Manis gigantea	skins	TG	0	0	0	0	0	0	0	0	10	0	225	235
Manis tetradactyla	live	TG	3	0	0	1	0	0	0	0	0	8	0	12

Manis tricuspis	live	TG	0	0	0	16	520	0	0	12	458	0	1006
Manis gigantea	skins	TH	0	0	0	0	0	0	0	0	0	10	10
Manis javanica	skins	TH	0	0	0	1	0	0	0	0	0	0	1
Manis spp.	skins	TH	0	0	0	0	0	0	0	50	0	0	20
Manis tricuspis	skins	TH	0	0	0	0	0	0	0	50	0	100	150
Manis pentadactyla	live	TW	0	0	0	1	0	1	0	0	2	0	4
Manis gigantea	skins	US	0	0	0	0	0	0	0	0	0	225	225
Manis pentadactyla	bodies	US	0	0	0	0	0	0	0	1	0	0	1
Manis pentadactyla	skins	VN	2	0	0	0	0	0	0	0	0	0	2
Subtotal:	bodies		1	1	1	1	1	0	3	4	8	2	22
Subtotal:	live		5	0	2	38	520	15	2	24	526	11	1143
Subtotal:	skins		2	1	1	1	4	0	1001	369	0	560	1939
Subtotal:	trophies		0	0	0	0	0	0	0	0	0	1	1
Grand total:			8	2	4	40	525	15	1006	397	534	574	3105

Source: CITES Trade Database search for net exports of Manis spp. from all countries, all sources, all purposes on May 8th, 2015, with results for M. temminckii omitted and filtered for live, skins, bodies and trophies.

ii. Global Net Exports of Pangolins and their Products Measured in Kilograms

In terms of total volume as represented in the CITES trade data in kilograms, 3,696 kg of net exports of pangolin products were recorded between 2004 and 2013. These products equate to approximately 8,302 individual pangolins. The vast majority (3,686 kg, or 99.7%) of these products were scales, with only 10 kg of other products reported in net exports. 2,800 kg of the scales were exports of *M. javanica* scales, which equate to approximately 7,778 individuals of this species ($2,800 \div 0.36 \text{ kg/individual} = 7,778$); 60 kg of *M. tricuspis* scales, which equate to approximately 100 individuals ($60 \div 0.6 \text{ kg} = 100$ individuals) ; 501 kg of *Manis* spp. $\div 1.44 \text{ kg} = 348$ individuals. $7,783 + 100 + 348 = 8,231$, plus the remaining products, which equate to about 1 individual, bringing the total to 8,232 (see Table A2).

The vast majority of these exports were from Singapore, which reported exports of 2.8 tons of *M. javanica* scales between 2009 and 2012, and an additional 500 kg of *Manis* spp. scales exported in 2010, for a total of 3.3 tonnes of pangolin scales, all exported to China in the span of four years. This means that Singaporean exports comprised approximately 92% of the total global net exports of pangolins and their products measured in kilograms for this ten-year span (see Table A2). It must be noted here that these exports occurred despite the CITES zero export quota in place for this species during this time period.

The 245 kg of pangolin product exports measured in kilograms from Togo comprised nearly the entirety of the remaining amount of the global net exports; approximately 7% of the total.

Table A2: Global Net Exports of Pangolins and their Products from 2004-2013, all sources and purposes, in kilograms

Taxon	Term	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
Manis spp.	bodies	CM	0	0	0	2	0	0	0	0	0	0	2
Manis spp.	derivatives	CN	0	0	0	0	0	0	2	0	0	0	0
Manis spp.	scales	CN	0	0	0	0	0	0	0	0	1	0	1
Manis spp.	meat	GH	0	0	0	0	0	2	0	0	0	0	2
Manis javanica	scales	SG	0	0	0	0	0	1000	1000	0	800	0	2800
Manis spp.	scales	SG	0	0	0	0	0	0	500	0	0	0	500
Manis gigantea	scales	TG	0	0	0	0	0	0	0	50	135	0	185

Manis tricuspis	scales	TG	0	0	0	0	0	0	0	0	0	60	60
Manis pentadactyla	specimens	TW	0	0	0	0	0	14	0	0	0	0	14
Manis gigantea	scales	UG	0	0	0	0	0	0	0	0	0	70	70
Manis pentadactyla	derivatives	VN	0	0	0	0	0	0	1	0	0	0	1
Manis pentadactyla	derivatives	VN	0	0	0	0	0	0	1	0	0	0	1
Manis pentadactyla	medicine	VN	0	0	0	0	0	0	0	0	2	0	2
Subtotal:	bodies		0	0	0	2	0	0	0	0	0	0	2
Subtotal:	derivatives		0	0	0	0	0	0	4	0	0	0	4
Subtotal:	meat		0	0	0	0	0	2	0	0	0	0	2
Subtotal:	medicine		0	0	0	0	0	0	0	0	2	0	2
Subtotal:	scales		0	0	0	0	0	1000	1500	50	1006	130	3686
Grand Total:			0	0	0	0	0	1000	1504	50	1008	130	3696

Source: CITES Trade Database search for net exports of *Manis* spp. from all countries, all sources, all purposes on May 8th, 2015, with results for *M. temminckii* omitted and filtered for specimens reported in kilograms.

iii. Global Net Exports of Pangolin Derivatives and Medicines

Another significant type of pangolin product in trade is “medicinal” products for “Personal” or “Commercial” purposes, which are reported as “medicine” or “derivatives” in CITES trade data. 27,986 net exports of such products were reported between 2004 and 2013, and 99.9% of them were marked as having been illegally sourced (29 of them were marked as having been wild-sourced), and all of the products in the table below were listed as having been exported for “Commercial” or “Personal” purposes (see Table A3).

Viet Nam is the principal exporter of these products, with 24,214 net exports reported between 2004 and 2013, comprising 87% of the total global net exports for that period, all of which were seized as illegal specimens. China is also a major exporter, with 3,161 net exports reported between 2004 and 2013, comprising 11% of the total global net exports for that period, all of which were marked as having been seized as illegal specimens. It is worth noting here that the U.S. is by far the largest importer of these products, with 26,696 net exports (or approximately 95%) listed as having been imported into the U.S. between 2004 and 2013. Of these, 99.9% were marked as having been seized as illegal specimens. It must be noted here that these exports occurred despite the CITES zero export quota in place for Asian species during this time period. Exports for “personal” purposes may be a way to circumvent the CITES zero export quota which applies to trade for commercial purposes.

Table A3: Global Net Exports of Pangolin Products described as “Medicine” or “Derivatives” from 2004-2013, for Personal and Commercial Purposes

Taxon	Term	Unit	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
Manis spp.	derivatives		CA	0	0	0	0	0	0	0	1	0	0	1
Manis spp.	medicine		CA	0	0	0	0	0	0	0	0	1	0	1
Manis pentadactyla	derivatives		CN	0	0	0	0	48	180	0	0	0	0	228
Manis spp.	derivatives		CN	0	0	0	379	318	338	1698	100	0	0	2833
Manis spp.	medicine		CN	0	0	0	0	0	0	0	0	87	13	100
Manis spp.	derivatives		DE	0	0	0	0	3	0	0	2	0	0	5
Manis spp.	derivatives		HK	0	0	0	0	0	52	0	0	0	0	52
Manis pentadactyla	derivatives		ID	0	0	0	0	0	0	1	0	0	0	1
Manis pentadactyla	derivatives		LA	0	0	0	0	0	480	0	40	0	0	520
Manis spp.	derivatives		MY	0	0	5	0	0	0	0	0	0	0	5
Manis javanica	derivatives		TH	0	0	0	0	0	0	0	2	0	0	2
Manis pentadactyla	derivatives		VN	0	0	0	0	0	18323	5140	0	0	0	23463

Manis pentadactyla	medicine		VN	0	0	0	0	0	0	0	0	201	0	201
Manis spp.	derivatives		VN	0	0	24	0	144	15	153	8	0	0	344
Manis spp.	medicine		VN	0	0	0	0	0	0	0	0	53	153	206
Manis spp.	derivatives		XX	0	0	0	0	0	24	0	0	0	0	24
Subtotal:	derivatives			0	0	29	379	513	19412	6992	153	0	0	27478
Subtotal:	medicine			0	0	0	0	0	0	0	0	342	166	508
Grand Total:				0	0	29	379	513	19412	6992	153	342	166	27986

Source: CITES Trade Database search for net exports of Manis spp. from all countries, all sources, all purposes on May 8th, 2015, with results for M. temminckii omitted and filtered for specimens described as "Medicine" or "Derivatives."

b. Global Net Imports of Pangolins and their Products from All Sources and for All Purposes

According to original analysis of CITES trade data, global net imports of: 2,828 products that each represent an individual pangolin (see Table B1); 3,618 kg of pangolin scales and 24 kg of other products measured in kg (see Table B2) were reported between 2004 and 2013. This represents approximately 8,232 pangolins, which brings the total net imports of pangolins reported during this period to approximately 11,060.

According to these data, Mexico and Italy are the top two importers of pangolin products that each represent an individual pangolin, with Viet Nam and Lao PDR also playing a role in global imports of these products. China was by far the largest importer of pangolins and their products reported in kilograms, with net imports comprising approximately 90% of the global net imports, and Viet Nam and Thailand also playing a role in the global net imports in products reported in kilogram units.

i. Global Net Imports of Pangolin Products that Each Represent an Individual Pangolin (bodies, live, skins, trophies)

According to original analysis of CITES trade data, net imports of 2,828 products that each represent an individual pangolin were reported between 2004 and 2013 (see Table B1 below).

Mexico is the principal importer of pangolins and their products that each represent an individual animal, with 1,335 net imports having been reported between 2004 and 2013, comprising approximately 47% of the global net imports of such pangolin products during that period.

Italy is also a major importer of pangolins and their products that each represent an individual animal, with 515 net imports having been reported between 2004 and 2013, comprising approximately 18% of the global net imports of such pangolin products during that period.

Lao PDR, Thailand and Viet Nam also play a role in the import of pangolins and their products that each represent individual animals, with net imports respectively representing 11%, 7%, and 7% of the total global net imports in such products between 2004 and 2013 (see Table B1 below).

Given the zero export quota for wild-caught Asian pangolin species for commercial purposes, which was in effect throughout the period studied, Mexico's import of 1,000 skins of *M. pentadactyla* from Lao PDR in 2010 is of concern, as is Italy's import of 500 live specimens of *M. tricuspis*; both were marked as being sourced from ranching operations, despite evidence that captive breeding operations have been largely unsuccessful (Yang et al., 2007). This once again raises concerns that CITES documentation was falsified to circumvent the zero export quota for these species.

Table B1: Global Net Imports of Pangolins and their Products (bodies, live, skins trophies)

Taxon	Term	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
<i>Manis tricuspis</i>	live	AE	0	0	0	0	0	0	2	2	0	0	4
<i>Manis tricuspis</i>	live	CZ	0	0	0	10	0	0	0	0	0	0	10
<i>Manis pentadactyla</i>	live	DE	0	0	0	1	0	1	0	0	0	0	2
<i>Manis gigantea</i>	live	ES	0	0	0	0	0	0	0	0	5	0	5
<i>Manis tetradactyla</i>	live	ES	0	0	0	0	0	0	0	0	5	0	5
<i>Manis tricuspis</i>	live	ES	0	0	0	0	0	0	0	0	5	0	5
<i>Manis</i> spp.	bodies	FJ	0	0	0	0	0	0	0	0	0	1	1
<i>Manis gigantea</i>	bodies	FR	1	0	0	0	0	0	0	0	0	0	1
<i>Manis tricuspis</i>	live	FR	0	0	2	0	0	0	0	0	0	0	2
<i>Manis tetradactyla</i>	skins	FR	0	0	0	0	0	0	0	2	0	0	2
<i>Manis tricuspis</i>	skins	FR	0	0	0	0	0	0	0	6	0	0	6
<i>Manis tricuspis</i>	trophies	FR	0	0	0	1	2	0	0	0	0	0	3
<i>Manis javanica</i>	bodies	GB	0	0	0	0	0	0	0	0	6	0	6
<i>Manis javanica</i>	live	HK	0	0	0	0	0	0	0	0	0	11	11
<i>Manis tricuspis</i>	live	IT	0	0	0	15	500	0	0	0	0	0	515
<i>Manis gigantea</i>	live	JP	0	0	0	0	0	0	0	10	3	0	13
<i>Manis pentadactyla</i>	live	JP	2	0	0	0	0	0	0	0	2	0	4
<i>Manis tetradactyla</i>	live	JP	0	0	0	0	0	0	0	0	3	0	3

Manis tricuspis	live	JP	0	0	0	0	0	4	0	12	3	0	19
Manis tricuspis	live	KR	0	0	0	0	0	10	0	0	0	0	10
Manis gigantea	live	LA	0	0	0	0	0	0	0	0	50	0	50
Manis tricuspis	live	LA	0	0	0	0	0	0	0	0	250	0	250
Manis gigantea	skins	MX	0	0	0	0	0	0	0	0	0	235	235
Manis pentadactyla	skins	MX	0	0	0	0	0	0	1000	0	0	0	1000
Manis tricuspis	skins	MX	0	0	0	0	0	0	0	0	0	100	100
Manis tetradactyla	live	NL	0	0	0	1	0	0	0	0	0	0	1
Manis tricuspis	live	NL	0	0	0	1	0	0	0	0	0	0	1
Manis pentadactyla	bodies	RU	0	0	0	0	0	0	0	0	0	1	1
Manis javanica	bodies	SG	0	0	0	0	0	0	0	1	1	0	2
Manis gigantea	skins	TH	0	0	0	0	0	0	0	10	0	0	10
Manis tricuspis	skins	TH	0	0	0	0	0	0	0	200	0	0	200
Manis tricuspis	live	TO	0	0	0	0	20	0	0	0	0	0	20
Manis spp.	bodies	US	0	1	1	1	1	0	3	1	1	0	9
Manis tricuspis	live	US	0	0	0	10	0	0	0	0	0	0	10
Manis tetradactyla	live	US	3	0	0	0	0	0	0	0	0	0	3
Manis javanica	skins	US	0	0	1	1	0	0	0	0	0	0	2
Manis pentadactyla	skins	US	2	0	0	0	0	0	0	0	0	0	2
Manis spp.	skins	US	0	1	0	0	0	0	1	50	0	0	52
Manis tricuspis	skins	US	0	0	0	0	0	0	0	51	0	0	51
Manis gigantea	trophies	US	0	0	0	0	0	0	0	0	0	1	1
Manis tricuspis	trophies	US	0	0	0	0	0	0	0	0	0	1	1
Manis tricuspis	live	VN	0	0	0	0	0	0	0	0	200	0	200
Subtotal:	bodies		1	1	1	1	1	0	3	2	8	2	20
Subtotal:	live		5	0	2	38	520	15	2	24	526	11	1143
Subtotal:	skins		2	1	1	1	0	0	1001	319	0	335	1660

Subtotal:	trophies		0	0	0	1	2	0	0	0	0	2	5
Grand total:			8	2	4	41	523	15	1006	345	534	350	2828

Source: CITES Trade Database search for net imports *Manis spp.* from all countries, all sources, all purposes on February 16th, 2015, with results for *M. temminckii* omitted.

ii. Global Net Imports of Pangolins and their Products Measured in Kilograms

Global net imports of 3,643 kg of pangolin products were reported in CITES trade data between 2004 and 2013. The vast majority of these products (3,618 kg) were scales, and 14 kg of specimens were reported as having been imported during this period. The scales were classified as having been products derived from *Manis spp.*, *M. javanica*, and *M. tricuspis*; scales of no other pangolin species were recorded in trade. Using the conversion standards described above, this represents approximately 8,300 pangolins (2,802 kg of *M. javanica* ÷ 0.36 kg = 7,783 individuals + 60 kg of *M. tricuspis* ÷ 0.6 kg = 100 individuals + 501 kg of *Manis spp.* ÷ 1.44 kg = 348 individuals. 7,783 + 100 + 348 = 8,231 estimated individuals in trade). The remaining products reported in kilograms equate to about 1 individual pangolin, bringing the total number of pangolins their products imported during this period and reported in kilograms to 8,232.

Of the legal trade in pangolin products with measured units, total volume of imports to China comprise approximately 90% of the market by volume, followed by Thailand (5%), Viet Nam (~2%), Hong Kong (~2%), and the U.S. (~1%).

Table B2: Global Net Imports of Pangolins and their Products, all sources, all purposes, in kilograms

Taxon	Term	Unit	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
<i>Manis spp.</i>	bodies	kg	US	0	0	0	2	0	0	0	0	0	0	2
<i>Manis pentadactyla</i>	derivatives	kg	US	0	0	0	0	0	0	1	0	0	0	1
<i>Manis gigantea</i>	scales	kg	TH	0	0	0	0	0	0	0	50	135	0	185
<i>Manis javanica</i>	scales	kg	CN	0	0	0	0	0	1000	1000	0	800	0	2800
<i>Manis javanica</i>	scales	kg	US	2	0	0	0	0	0	0	0	0	0	2
<i>Manis pentadactyla</i>	derivatives	kg	US	0	0	0	0	0	0	1	0	0	0	1
<i>Manis spp.</i>	scales	kg	US	0	0	0	0	0	0	0	0	0	1	1
<i>Manis spp.</i>	scales	kg	CN	0	0	0	0	0	0	500	0	0	0	500
<i>Manis spp.</i>	derivatives	kg	US	0	0	0	0	0	0	2	0	0	0	2
<i>Manis spp.</i>	meat	kg	US	0	0	0	0	0	0	0	0	0	0	0
<i>Manis spp.</i>	meat	kg	US	0	0	0	0	0	2	0	0	0	0	2
<i>Manis pentadactyla</i>	medicine	kg	US	0	0	0	0	0	0	0	0	1	0	1

Manis javanica	specimens	MI	GB	0	0	0	0	0	0	0	0	0	0	0.3	0.3
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Source: CITES Trade Database search for gross imports of Manis spp. products from Malaysia, all sources, all purposes on February 18th, 2015, with results for M. temminckii omitted.

Table B4: Gross Imports of Pangolin Products from Singapore from 2004 to 2013, in kilograms

Taxon	Term	Unit	Country	Origin	Purpose	Source	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
Manis javanica	Scales	Kg	CN	MY	W	T	0	0	0	0	0	1000	1000	0	800	0	2800
Manis spp.	Scales	Kg	CN	MY	W	T	0	0	0	0	0	0	500	0	0	0	500
Subtotal:	Scales	Kg					0	0	0	0	0	1000	1500	0	800	0	3300
Totals:							33	18	0	4	0	1000	1518	0	806	5	3384

Source: CITES Trade Database search for gross imports of Manis spp. products from Singapore, all sources, all purposes on February 18th, 2015, with results for M. temminckii omitted and filtered for specimens reported in kilograms.

iii. Global Net Imports of Pangolin Derivatives and Medicines

A total of 27,986 global net imports of pangolin “derivatives” and “medicines” were reported between 2004 and 2013 (see Table B5). The U.S. is the principal importer of such products, having reported net imports of 26,696 such products between 2004 and 2013, comprising 95% of the global net imports during this period. The vast majority of these products (87%) were imported from Viet Nam, and another 11% imported from China. It is essential to note here that 99.9% of these products were marked in the database as having been seized as illegal specimens. This indicates the major role the U.S. plays as a destination for the illicit trade in pangolin derivatives and medicines from Viet Nam and China.

Table B5: Global Net Imports of Pangolin Products described as “Medicine” or “Derivatives” from 2004-2013, for Personal and Commercial Purposes

Taxon	Term	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Totals:
Manis spp.	Derivatives	NO	0	0	0	0	0	1	0	0	0	0	1
Manis spp.	Derivatives	NZ	0	0	0	10	90	0	1189	0	0	0	1289
Manis spp.	Derivatives	US	0	0	29	369	375	428	662	111	0	0	1974
Manis pentadactyla	Derivatives	US	0	0	0	0	48	18983	5141	40	0	0	24212
Manis javanica	Derivatives	US	0	0	0	0	0	0	0	2	0	0	2

Manis pentadactyla	Medicine	US	0	0	0	0	0	0	0	0	201	0	201
Manis spp.	Medicine	US	0	0	0	0	0	0	0	0	141	166	307
Subtotals:	Derivatives		0	0	29	379	513	19412	6992	153	0	0	27478
Subtotals:	Medicine		0	0	0	0	0	0	0	0	342	166	508
Totals:			0	0	29	379	513	19412	6992	153	342	166	27986

Source: CITES Trade Database search for net imports of *Manis spp.* from all countries, all sources, all purposes on May 8th, 2015, with results for *M. temminckii* omitted and filtered for specimens described as “Medicine” or “Derivatives.”

ii. International Illegal Trade in Pangolins and their Parts

1. Overview

a. Scale of the Illegal Trade

The number and volume of legal trade in pangolins and their products is dwarfed by the illegal trade, evidenced by the massive amount of pangolins and their products seized by authorities annually. The above analysis estimates that approximately 11,268 pangolins were legally traded over the decade studied. In contrast, original analysis of publically available seizure reports indicates that as many as 930,370 pangolins were trafficked between 2004 and 2013.

b. Illegal Trade in Pangolins and their Parts is Escalating

The illegal trade also appears to be increasing each year at an alarming rate. According to original analysis of data compiled from publically available reports of seizures of pangolins and their products, only 6 seizures took place in 2004, while 31 took place in 2013. The volume of pangolin products reported in seizures is also increasing, with approximately 9,846 kg of pangolins and their products seized in 2004, compared to 53,760 kg in 2013. Despite range State laws and CITES zero export quotas prohibiting trade in pangolins and their products, pangolins are still traded illegally in huge quantities in Asia for traditional Chinese medicinal use (Zhou et al., 2014).

The illegal trade is especially evident in China, where a crackdown on pangolin trafficking in Yunnan instigated in 2007 apprehended a criminal gang that had smuggled over 20 metric tons of scales during the preceding 7 years (Zhou et al., 2014); this is equal to approximately 13,888 pangolins, using the same calculation as above for *Manis spp.* At the 65th meeting of the Standing Committee of CITES in July, 2014, the CITES Secretariat reported:

“Information received by the Secretariat suggests that the illegal trade in pangolin specimens is escalating at an alarming rate. In April 2013, for example, the Regional Intelligence Liaison Office for Asia and the Pacific of the World Customs Organization

reported the discovery of more than 10 tonnes of frozen pangolin on a Chinese fishing vessel that had run aground as it was returning to China from Malaysia. Another example is the seizure of 6,200 kg of frozen pangolin that originated from Indonesia, at the Hai Phong port in Viet Nam, on 12 August 2013. Further to this, 20 seizures of pangolin specimens were made in January 2014...” (CITES SC 65 Doc. 27.1, 2014).

c. Illegal Trade in Pangolins is Unsustainable

The sheer numbers indicated by the original analysis of seizure data indicate illicit trade in massive volumes that are clearly unsustainable for all seven species of pangolin in this Petition. Given the slow reproductive rate of pangolins, and other threats to their survival including habitat loss, this unsustainable level of illegal trade has had and will continue to have a significant impact on wild populations and is directly contributing to the collapse of pangolin populations worldwide.

d. The U.S. Plays a Role in the Illicit Trade in Pangolins and their Parts

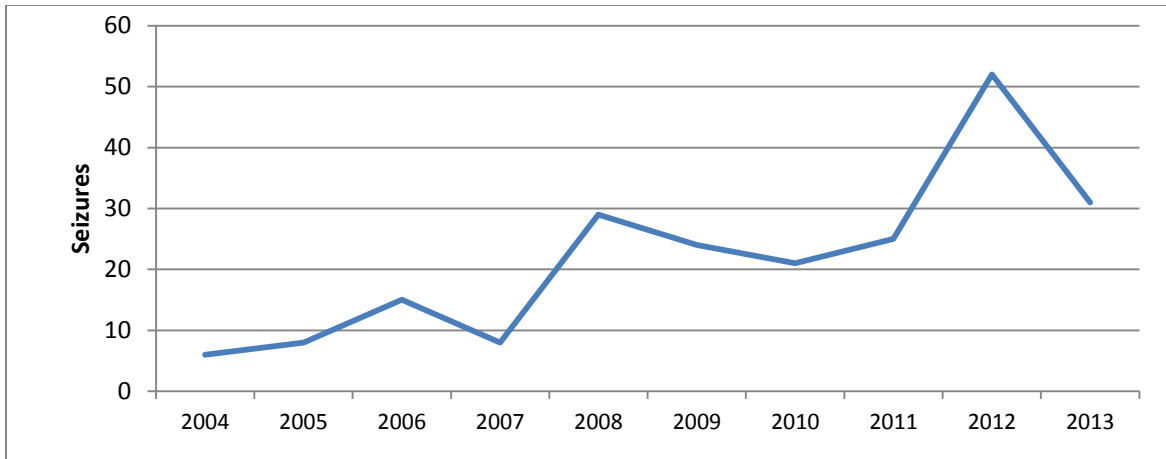
As described above, the U.S. is the principal importer of pangolin products described as derivatives and medicines in the CITES trade database, with net imports comprising 95% of the global net imports of these products between 2004 and 2013. Of these products, 99.9% were marked in the database as having been seized by authorities as illegal specimens. This is indicative of the fact that the U.S. is a major destination for illicit pangolin products.

2. Pangolins Seizure Data: TRAFFIC and Media Reports

The sheer volume of pangolins and their products from publically available reports such as TRAFFIC seizure reports and media reports, combined with the frequency of such seizures over the past ten years are indicative not only of the continuing illegal trade for pangolin products, but of the massive scale on which this trade continues to occur. This is also indicative of the global efforts of enforcement authorities cracking down on illegal wildlife trade.

According to publically available data, at least 219 seizures of pangolins and pangolin products occurred between 2004 and 2013, and the trend indicates a continuing increase in seizures over the period. Only 6 seizures of illicit pangolin products occurred in 2004, compared to 31 seizures in 2013 (see Figure 1 below). Total number of pangolins and their products found in seizures indicates a trend that illicit pangolin products continue to be seized, continuing demand for pangolins and their products, and a persisting illicit market for these products on an immense scale. Total volume of illicit pangolin products seized in 2004 totaled 9,846 kg, compared to 53,760 kg in 2013 (see Figures 2 and 3 below).

Figure 1: Total Seizures of Pangolins and their Products



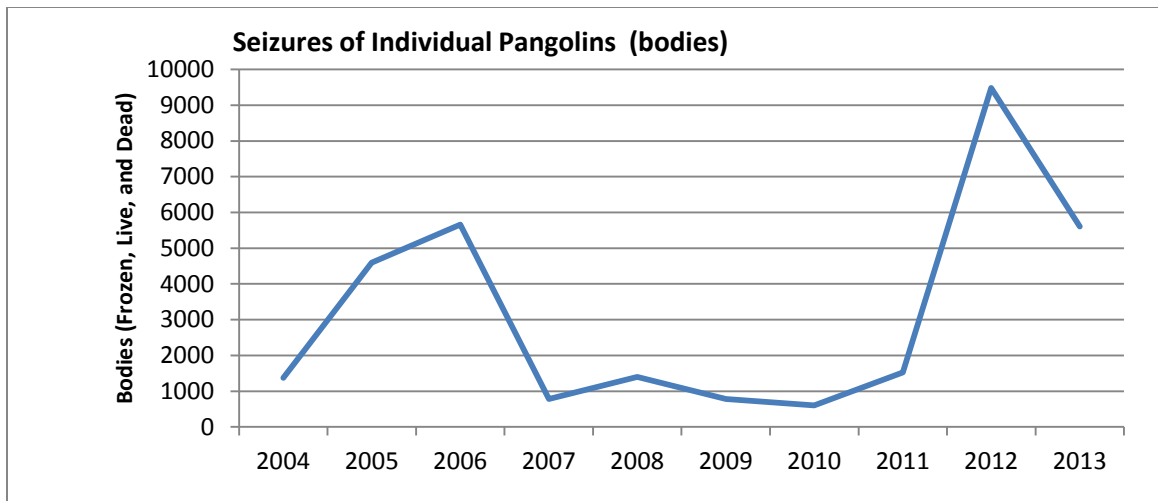
Source: Original analysis of TRAFFIC seizure reports and media reports, see Table C in Annex

Figure 2: Pangolins and their Products from Seizures (in kg)



Source: Original analysis of TRAFFIC seizure reports and media reports, see Table C in Annex

Figure 3: Pangolins Reported in Seizures (bodies)



Source: Original analysis of TRAFFIC seizure reports and media reports, see Table C in Annex

Data from these reports also indicate the continuing illegal trade in pangolins and their products, and the immense volume of this illegal trade. An estimated 33,008 individual pangolins were seized, along with 37,560 kg of scales, 109,866 kg of meat, and 55,544 kg of bodies (frozen, live and dead), between 2004 and 2013. This is equivalent to an estimated 63,407 individual pangolins recorded, plus the 33,008 pangolins reported as individuals equals an estimated 96,415 individual pangolins recorded in seizures between 2004 and 2013. By multiplying that number by the average weight of *Manis spp.*, this equates to an estimated total of 606,450 kg (60.6 metric tons) of pangolins and their products reported in seizures alone in this period.¹

These data indicate that between 2004 and 2013, and using the aforementioned INTERPOL rule of thumb, an estimated total of as many as 6,064,500 kg (6,064 metric tons), or 964,150 individual pangolins were traded illegally during this period (Calculation: if 96,415 individuals represents 10% of the total, then the total is approximately 964,150 pangolins traded illegally over the period). Given the slow reproductive rate of pangolins, and additional threats to their survival including habitat loss, this unsustainable level of illegal trade has had and will continue to have a significant impact on wild populations and is directly contributing to the collapse of pangolin populations worldwide. With Asian pangolin populations already in rapid decline, there is evidence that African pangolins are being targeted for Asian markets (Svenson et al., 2014), further increasing pressure on the genus. Heightened protection from legal instruments like an Endangered listing under the ESA is warranted to prevent the extinction of pangolins, further

¹ An estimated conversion to individual pangolins impacted can be calculated from the weight of seized scales as described above, and an average meat to individual pangolin conversion ratio was calculated by subtracting the average 25% weight ratio of skin and scales (Chen 2012, THT) from the average total weight of *Manis spp.*, resulting in an average of 4.72 kg per pangolin. An average total body weight to individual conversion ratio is estimated at 6.29 kg for *Manis spp.* (Calculation: average body weight of *M. javanica* is estimated at 8 kg (Hogg 2003); average body weight of *M. pentadactyla* is estimated at 4.85 kg (Heath 1992); average body weight of *M. crassicaudata* is estimated at 9.5 kg (Irshad et al. 2015); average weight of *M. culionensis* is estimated at 2.1 kg (Gaubert & Antunes 2005); average body weight of *M. gigantea* is estimated at 12 kg; average body weight of *M. tricuspis* is estimated at 2 kg; average body weight of *M. tetradactyla* is estimated at 2.2 kg; average body weight of *M. temminckii* is estimated at 9.7 kg (Tikki Hywood Trust 2015). $8 + 4.85 + 9.5 + 2.1 + 12 + 2 + 2.2 + 9.7 = 6.29$ kg per individual of *Manis spp.* According to these calculations, (Calculation: $(28,717 \text{ kg of scales} \div 1.2 = 23,871 \text{ individuals}) + (109,866 \text{ kg of meat} \div 4.72 = 23,276 \text{ individuals}) + (49,343 \text{ kg of bodies} \div 6.29 = 7,844 \text{ individuals}) = \text{an estimated } 54,991 \text{ individual pangolins}$ recorded in seizures between 2004 and 2013, or an estimated total of 345,893 kg (34.5 metric tons) of pangolins and their products reported in seizures alone in this period

highlighted by indications of the significant role the U.S. plays in the demand for and the global illicit trade in pangolin products.

3. Pangolin Seizure Data: LEMIS Data

LEMIS data on pangolin products seized in the U.S. indicate a continuing demand for pangolin products in the U.S. According to these data, over 30,000 products have been seized between 2004 and 2013, the overwhelming majority of which were classified as “medicine,” from China and Viet Nam, with an average 2,900 such products seized annually (see Table C in Annex). By extrapolating these data using the same INTERPOL calculation, this means that an estimated 26,000 products derived from pangolins are being imported illegally into the U.S. each year, with an estimated total of 260,000 products imported into the U.S. over the past decade. This represents a significant demand for pangolin products in the U.S., and the large scale of illicit trade of pangolin products into the U.S. despite current regulations. Further complicating the enforcement and implementation of the law is the fact that it is impossible to determine what species these “medicinal” powders and packaged products are derived from, and because of this, it is very possible that such products derived from Asian pangolin species, for which a zero export quota is in effect, and therefore they are also being imported illegally.

Furthermore, even when whole scales or individuals are in trade, it is very difficult for enforcement agencies to determine authoritatively that the species listed for the parts or products is actually the listed species, as scales and skins vary significantly between individuals of the same species, so it can be very difficult to discern between different pangolin species based solely on scale or skin appearance.

iii. International Trade: Conclusions

According to the original analysis of CITES trade data, the equivalent of approximately 11,268 individual pangolins were legally traded between 2004 and 2013, while original analysis of publically available seizure reports indicates that an estimated 930,370 pangolins were traded illegally during this period, totaling an estimated 975,418 pangolins in both legal and illegal trade during those ten years. In addition, CITES trade data and LEMIS data indicates that the U.S. is a major trade destination for illegally-sourced pangolin derivatives and medicines, with about 30,000 products imported illegally between 2004 and 2013. This indicates that the U.S. is a major trade destination for illicit pangolin products.

Clearly, the legal trade as reported through the CITES trade database is dwarfed by the massive scale of the illegal trade in pangolins, which is on the rise, even while wild pangolin populations are in sharp decline. Continuing demand for pangolins and their products in Asia is driving illegal trade from Africa, and threatens to bring the entire genus to the brink of extinction. This, in conjunction with evidence of the major role that the U.S. plays in the trade of illicit pangolin products, is indicative of the urgent need for increased protection for pangolins under the ESA, to prevent the illicit trade in pangolins and their products.

C. Disease or Predation

Pangolins have several natural predators in addition to humans including lions, tigers, leopards, crocodiles, African rock pythons and other large predators (Kingdon & Hoffman, 2013). However, the pangolin's durable keratin scales make them nearly impervious to these predators. Therefore, natural predation is not a major factor in pangolin population declines.

The life history and conservation needs of pangolins in the wild are relatively understudied (Challender et al., 2012b). The prevalence of disease as it relates to the sustainability of pangolin populations is no exception. Besides a few studies which found high concentrations and large proportions of tick infestations in *M. javanica*, studies specifically focused on parasites or diseases are lacking (Hassan et al., 2013). Therefore, it is impossible to determine at this time if disease has an appreciable effect on their conservation status.

D. Inadequacy of Existing Regulatory Mechanisms

a. CITES

Pangolins have been on the agenda at CITES for the last 40 years; they were one of the first taxa listed on the CITES Appendices. At that time—the first Convention of the Parties (CoP) to CITES in 1975—all Asian pangolins were listed on Appendix II of CITES by genus (*Manis*) and one African species, *M. temminckii*, was listed on Appendix I (Pantel & Yun, 2009). In 1976, the remaining three African species (*M. gigantea*, *M. tetradactyla*, and *M. tricuspis*) were listed on CITES Appendix III for Ghana only (Sodeinde and Adedipe, 1994). In 1994, all eight pangolin species were transferred to CITES Appendix II (CITES CoP 9 Prop. 7, 1994; CITES CoP 9 Prop. 8, 1994). In 2000, at CITES CoP 11, India, Nepal, Sri Lanka, and the U.S. proposed to transfer the Asian species to Appendix I (CITES CoP11 Prop. 13, 2000). Although the proposal did not pass, the Parties agreed to a zero-export quota for wild specimens of Asian species for commercial purposes (Pantel & Yun, 2009). However, in spite of these protections, poaching and illegal trade of Asian pangolins and their parts is increasing.

International trade in species listed on CITES Appendix II must be strictly regulated in order to avoid overutilization (CITES, 1973a). This is accomplished for Appendix II species by the issuance of permits from the exporting country and the presentation of those export permits to the importing country. The exporting country must ensure that a number of conditions are met before issuing an export permit. These are (CITES, 1973b):

- (a) A Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species;
- (b) A Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and
- (c) A Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.

Furthermore, a Scientific Authority of the exporting country must monitor both the export permits granted and the actual exports of such specimens (CITES, 1973b):

Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species.

The CITES Parties have recognized that proper implementation of Article IV is essential for the conservation of Appendix II species, (CITES, 2004), and national laws are paramount to that implementation. The Parties have agreed to a “Significant Trade Review” for certain Appendix II species in which the biology and management of and trade in these species are examined and, when the provisions of Article IV are not being met, remedial measures are directed to the relevant Parties. Non-compliance with recommended measures can result in trade suspensions.

Currently, pangolin specimens are exported from countries where their off-take is unsustainable, and the U.S. imports pangolin specimens from countries where pangolin off-take is untenable (see the International Trade Section above). This is a clear indication that CITES Article IV is not being complied with, either due to insufficient domestic implementing legislation or inadequate enforcement or both, and further, that the Convention does not adequately protect Asian and African pangolin species from extinction. Furthermore, the CITES-implementing legislation in the U.S., the ESA, does not provide protection for seven of the eight pangolin species; the only species protected is *Manis temminckii*, which is listed as Endangered under the ESA. Thus, the majority of pangolin specimens can be legally imported to the U.S. simply upon presentation of a CITES export permit from the country of export. Additionally, there is currently no requirement under U.S. law or CITES that the U.S. needs to examine the basis for the permit, or verify that the export permit was issued in compliance with CITES.

CITES Article VIII requires Parties to “take appropriate measures to enforce the provisions of the Convention and to prohibit trade in specimens in violation thereof”. Resolution Conf. 8.4 (Rev. CoP15) on national laws for implementation of the Convention, established a 47 National Legislation Project in 1992 to review national legislation of Parties. Several major pangolin exporting countries, including Bangladesh, Benin, Botswana, Central African Republic, Congo, Gabon, Ghana, Guinea-Bissau, India, Kenya, Liberia, Malawi, Mozambique, Nepal, Pakistan, the Philippines, Rwanda, Sri Lanka, Uganda, Tanzania, and Zambia are currently listed under “Category 2”, which means they meet some, but not all, of the necessary legislative requirements for implementing CITES, or “Category 3”, which means they do not meet any of the necessary legislative requirements for implementing CITES. Thus, although they are Parties to CITES, none of these important pangolin range States have the national legislation necessary to fully implement the Convention or adequately protect their endemic pangolin species.

b. Asia

i. ASEAN WEN

The Association of Southeast Asian Nations' Wildlife Enforcement Network (ASEAN-WEN) is the world's largest wildlife law enforcement network and involves police, customs, and environment agencies of all ten ASEAN countries: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Vietnam, and Thailand; it is also linked with CITES, Interpol, the USFWS, the U.S. Department of Justice (DOJ), and other wildlife law enforcement groups (ASEAN-WEN, 2013). These countries share information to combat the illegal wildlife trade in Southeast Asia at annual meetings and workshops (ASEAN-WEN, 2013).

All ten ASEAN-WEN countries are range States to Asian pangolin species. Even though the mandate of this regulatory body is to protect endangered species for future generations (ASEAN-WEN, 2013), their efforts have not been enough to adequately ensure the survival of Asian pangolin species, as proven by the rapid decimation of their populations due to wildlife trafficking and habitat loss throughout their range States (Challender et al., 2014c).

ii. Range Country Mechanisms

Although the four Asian pangolin species are protected to some extent under existing regulatory regimes throughout the Asian range States, as evidenced by the severe amount of poaching and illegal trafficking that continues today, it is clear these regulations are failing at adequately preventing pangolin species from being illegally trafficked to extinction.

In China, the Indian pangolin (*Manis crassicaudata*), the Chinese pangolin (*M. pentadactyla*) and the Sunda pangolin (*M. javanica*) are all classified as State Category II protected species under the Protection of Wildlife Act of 1989 (Baillie et al., 2014). These protections increased in 2007, when a notification issued by Chinese agencies strengthened regulations on species used in traditional medicines, including all Asian species of pangolins (Challender et al., 2014a). As a result, a ban was placed on the issuance of hunting licenses for these species, and existing pangolin scale stockpiles are now subject to verification, certification, and trade through designated outlets, such as hospitals (Challender et al., 2014a). Despite these protections, tens of thousands of Sunda pangolins (*M. javanica*) are still imported to China every year (Challender et al., 2014b), and China remains the biggest importer and consumer of pangolins and their derivatives (Challender et al., 2014c; Nuwer, 2015).

In Viet Nam, the second greatest pangolin consuming country, both the Sunda pangolin (*Manis javanica*) and the Chinese pangolin (*M. pentadactyla*) are legally protected under Group IIB of Decree 32 on the Management of Endangered, Precious, and Rare Species of Wild Plants and Animals of 2006 (Challender et al., 2014c). However, Section 9 of this law enables pangolins seized from the illicit trade to be legally sold back into trade (Challender et al., 2014a). Furthermore, because it remains legal under Vietnamese law, pangolins seized from the international trade are frequently auctioned off by provincial authorities (Challender et al., 2014c). Unsurprisingly, it is extremely difficult for Vietnamese enforcement agencies to find a solution for confiscated pangolins that does not further feed the international illegal trade (Challender et al., 2014c). Clearly, more legal protection is needed to adequately combat the widespread trafficking and consumption occurring within this country.

Even in places where pangolin species are given the highest domestic protections, such as in Pakistan, trade still occurs to the point of extreme unsustainability. In Pakistan, the Indian pangolin (*Manis crassicaudata*) is protected under the Islamabad Wildlife Protection, Preservation, Conservation, and Management Ordinance of 1979 (Schedule III) as well as under the North-West Frontier Province Wildlife Act of 1975 (Baillie et al., 2014). However, *M. crassicaudata*—the only pangolin species native to Pakistan—is rapidly disappearing due to heavy poaching over the last few years (Mahmood et al., 2014).

Another example can be found in India, where the Chinese pangolin (*Manis pentadactyla*), Sunda pangolin (*M. javanica*), and Indian pangolin (*M. crassicaudata*) are completely protected under Schedule I of India's Wildlife Protection Act of 1972 (Baillie et al., 2014). Despite these protections, trade trends indicate the Indian pangolin and its parts—in addition to the two other species—are now frequently found in illegal international trade with origins in India, Pakistan, and potentially Nepal (Mahmood et al., 2014).

Lastly, in Thailand, all *Manis* species are classified as Protected Wild Animals under the 1992 Wild Animals Reservation and Protection Act in Thailand B.E. 2535 (Challender et al., 2014a). However, both Thailand and Lao PDR serve as significant transit countries for the illicit wildlife trade in live animals from Southeast Asia to East Asia, including pangolins (Challender et al., 2014b). One result of this is the further decrease of the already severely imperiled Sunda pangolin (*M. javanica*) in the southern part of Thailand (Challender et al., 2014b).

The above examples demonstrate what is true throughout the Asian range States. Although many countries classify pangolin species under their regional and domestic conservation laws, these protections, largely due to a lack of capacity and resources, are largely nominal and are doing very little to protect the most trafficked animals in the world from disappearing forever.

c. Africa

i. African Union

The African Union (AU) is the organizational body created to provide an arena to discuss and develop Africa-wide resolutions and conventions. Formed in 1992 as the successor to the Organization of African Unity, which was created in 1963, the AU's member states include all but one of the 54 African states (Morocco). The AU is governed by an Executive Council that presents conventions on issues of interest to member states.

The African Convention on the Conservation of Nature and Natural Resource, entered into force in 1969, is one such convention that requires contracting states to “adopt measures to ensure conservation, utilization, and development of soil, water, flora, and faunal resources in accordance with scientific principles and with due regard to the best interests of the people” (AU, 1968). The Convention lists the three African pangolin species in this petition as a “Class B” species which, according to the convention, “shall be totally protected, but may be hunted, killed, captured or collected under special authorization granted by the competent authority” (AU, 1968). As of 2013, 31 countries have signed the Convention, including all range countries for the three non-listed African species (AU, 2013).

However, the Convention does not include any enforcement mechanisms to require countries to comply, nor does it designate the role and frequency of meetings to update the agreement.

ii. Range Country Mechanisms

Pangolins are protected by national laws in most African range States, but these laws do not contribute much to the conservation of these species, or protect the species from poaching (Boakye et al., 2014). Wildlife poaching and trade is generally a low risk enterprise for hunters and smugglers, and pangolin trade, which is much less publically scrutinized than elephant or rhino ivory trade, presents even less risk to the transgressors (Douglas & Alie, 2014). In rural areas where hunting takes place, awareness of the illegality of hunting pangolin is low, enforcement is rare, and if any penalty is assessed, it tends to be slight. For example, Nigerian law protects all three of its pangolin species as Schedule 1 under the 1985 Decree called “Control of International Trade in Endangered Wild Fauna and Flora” (Soewu & Adekanola, 2011). Yet, several studies have found open, unregulated sales of pangolin in bushmeat and medicine markets throughout the country, indicating both lack of awareness and enforcement of the aforementioned decree (Sodiende & Adedipe, 1994; Soewu & Ayodele, 2009; Soewu & Adekanola, 2011). A 2007 survey of Nigerian hunters found that 95% had no awareness of pangolin conservation status or legal structures (Soewu & Ayodele, 2009) while a survey of Nigerian traditional medicine practitioners also found a general lack of awareness (Soewu & Adekanola, 2011). Similarly, in Sierra Leone, all three species are protected under the Wildlife Conservation Act of 1972, yet punishment is rarely imposed, even if violators are apprehended and tried (Boakye et al., 2014). In Uganda, authorities recently attempted to allow the export of over seven metric tons of pangolin scales, despite CITES regulations prohibiting the export of Appendix II species without first determining if the products were legally obtained and will not be detrimental to the species. According to a local news article, a portion of the scales may have been illegally obtained from pangolins killed by poachers in the recent past, and Uganda did not conduct a study on whether the export would be detrimental (, 2015).

d. The U.S.

i. The Endangered Species Act

The Endangered Species Act (ESA, 16 U.S.C. §§ 1531 *et seq.*) is one of the most comprehensive laws governing wildlife conservation in the U.S., but the law does not apply to seven of the eight species of pangolin, even though the U.S. plays a significant role in the unsustainable trade of these species.

Pursuant to the ESA (16 U.S.C. § 1538(a)) and the U.S. Fish and Wildlife Service (USFWS) regulations (50 C.F.R. §§ 17.21, 17.22), once the Service lists a species as Endangered, individuals of listed species are protected from import, export, take, and interstate commerce unless such action will “enhance the propagation or survival of the affected species” or is for scientific research consistent with the conservation purpose of the ESA. 16 U.S.C. § 1539(a)(1)(A); 50 C.F.R. §§ 17.21, 17.22. As the plain language of the statute makes clear, enhancement authorization may only be issued for activities that *positively benefit* the species in

the wild. *See also* USFWS Handbook for Endangered and Threatened Species Permits (1996) (making clear that an enhancement activity “must go beyond having a neutral effect and actually have a positive effect”).

Enhancement authorization must be granted on a case-by-case basis, with an application and opportunity for meaningful public participation. 16 U.S.C. § 1539(c); *Friends of Animals v. Salazar*, 626 F. Supp. 2d 102, 119 (D.D.C. 2009). Before the Service can issue authorization to conduct otherwise prohibited acts, it must find that: (1) the permit or registration was “applied for in good faith;” (2) the permit or registration “will not operate to the disadvantage of such endangered species;” and (3) the proposed action “will be consistent with the purposes and policy” of the ESA (i.e., *conservation*²). 16 U.S.C. § 1539(c)-(d). As explained by Congress, these requirements were intended “to limit substantially the number of exemptions that may be granted under the act.” H.R. Rep. No. 93-412 at 17 (1973) (emphasis added). Implementing regulations further require that applicants provide detailed information about the animals, persons, facilities, and actions involved in the otherwise prohibited activity. 50 C.F.R §§ 17.21(g), 17.22; *id.* § 13.21(b)(2)(3) (authorization may not be issued if applicant “failed to disclose material information required” or “failed to demonstrate a valid justification”).

In deciding whether to issue an enhancement permit, the USFWS must consider “[t]he probable and indirect effect which issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;” “[w]hether the permit . . . would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;” “[t]he opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application;” and “[w]hether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.” 50 C.F.R. § 17.22(a)(2).

Foreign species that are listed under the ESA are protected from commercial activity including import and interstate commerce. 16 U.S.C. § 1538. One pangolin species, Temminck’s ground pangolin (*Manis temminckii*), was listed as Endangered under the ESA in 1976, soon after the Act was signed into law as part of a larger action to list 159 taxa of animals that were listed in CITES Appendix I at the time (USFWS, 1976). Nevertheless, as shown in the petition, pangolin products are regularly imported into the U.S. without an ESA permit, and in many cases, it is not known what species of pangolin the products are made from. It is exceedingly difficult (and sometimes impossible) to identify the species of pangolin involved in trade, especially when in popular forms such as scales, powder, and skins. Thus, the ESA is currently inapplicable to nearly all pangolin species, protection for the one listed species is substantially undermined by the lack of protection for the other species, and it is imperative that all pangolin species are listed as Endangered to ensure that imports of and interstate commerce in pangolin parts and products is strictly scrutinized to promote conservation.

² The primary purpose of the ESA is to “provide a program for the conservation of such endangered species.” 16 U.S.C. § 1531(b). The term “conservation” means “to use . . . all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary” – i.e., to recover the species in the wild so that it may be taken off of the list of endangered species. 16 U.S.C. § 1532(3).

ii. The Lacey Act

The Lacey Act is one of the oldest U.S. laws regulating the sale of wildlife and wildlife parts or products. Signed into law in 1900, the Lacey Act prohibits any commercial activity with wildlife or wildlife products that were illegally obtained by federal, state, Indian, or foreign law. The Lacey Act prohibits the import of or interstate commerce in species sold or transported in violation of CITES, and as noted above, all four Asian species are subject to a zero export quota. 16 U.S.C. § 3372(a)(1). Yet, CITES and Law Enforcement Management Information System (LEMIS) data show that despite this ban, Asian pangolin products continue to find their way into the U.S.. Further, as demonstrated herein, there is significant international trade in African pangolins that is currently legal, and the Lacey Act cannot be used to regulate the domestic market in legally-sourced pangolins (even though such trade is unsustainable).

E. Other Natural or Manmade Factors Affecting the Species' Existence

a. Pangolin Life History Contributes to Overhunting

Pangolins are exceptionally susceptible to overhunting due to certain biological and ecological characteristics (Sodiende & Adedipe, 1994). Pangolins have a slow reproductive rate, producing only one offspring per year (Heath, 1992a), have long gestation periods between 120 to 150 days (Kingdon & Hoffman, 2013), and attain sexual maturity at age two. As a result, pangolin populations cannot replace animals lost to hunting fast enough to maintain stable populations.

Pangolins are naturally sparsely distributed throughout their range, resulting in naturally low population sizes that are unable to withstand sustained hunting pressure. Pangolins are also relatively easy and safe to hunt due to their propensity to curl into a ball when threatened. This position is effective in warding off predators such as hyenas and leopards, but it is actually a convenience for human hunters who can pick the animal up and bundle it into a sack with very little effort or risk (Zhou et al., 2014). Pangolins are also slow moving and easily caught by hunting snares commonly used throughout their range (Burton, 2009; Fa et al., 2005). The combination of slow reproduction, low risk for hunters, and sparse distribution put the animals at an elevated risk for local extirpations or extinction due to hunting pressure.

b. Infeasibility of Domestication and Breeding

Pangolins are extremely difficult to maintain or breed in captivity, and most die within a short period of time after capture (within 6 months), primarily due to digestive problems (Yang et al., 2007). It is thought that these difficulties arise largely from stress; the forced, close proximity to humans causes severe anxiety for these shy species, which—when experienced over long periods of time—impacts their health, and can lead to internal organ damage, gastric stomach ulcers, and death (Yang et al., 2007; Pantel & Yun, 2009). Other factors leading to this heightened, extreme anxiety include sub-optimal diets, inappropriate enclosures, and close proximity to conspecifics (Challender et al., 2012b).

Stress is most often physically manifested through abnormal pacing and clawing. This has been observed primarily in captive Chinese pangolins (*Manis pentadactyla*) and Sunda pangolins (*M. javanica*) (Challender et al., 2012b). However, from a study on Indian pangolins in captivity by Mohapatra and Panda (2013), stereotypic pacing was also observed in Indian pangolins (*M. crassicaudata*), and the frequencies of pacing were comparable to those reported from Sunda pangolins (Challender et al., 2011).

Unsurprisingly, attempts to raise pangolins in captivity or use captive pangolins for ecological research have also been largely unsuccessful (Yang et al., 2007). Research on captive pangolins has therefore been limited to dietary husbandry, while information about their habitats and ecology remain sparse (Yang et al., 2007). This lack of ecological knowledge simply adds to the extreme difficulty of maintaining these species in captive conditions (Challender et al., 2012b). Also predictably, pangolins are not frequently found in zoos. As of 2012, there were only 19 Critically Endangered Sunda pangolins (*Manis javanica*) in three zoos and rescue centers worldwide (Challender et al., 2012b). Additionally, as of February 2014, the San Diego Zoo was the only North American zoo with a pangolin: *M. tricuspis* (tree pangolin) (Davis, 2014).

Several leading groups of pangolin experts have declared that breeding pangolins for conservation purposes is infeasible. The IUCN Pangolin Specialist Group gave “conservation breeding” the lowest priority rating possible (4 out of 1-4 scale) in their July 2014 Conservation Action Plan (Challender et al., 2014c). The Tikki Hywood Trust, a leader in the rescue and rehabilitation of seized ground pangolins, has stated that “captive breeding of ground pangolin is not a sound conservation approach at this time” (Hywood, 2015). Save Vietnams Wildlife, which has been rescuing pangolins since 2006, stated that commercial Asian pangolin farms are not an option to enhance conservation because of high mortality, low fecundity, and the effects it would have on demand (Nguyen, 2015).

Keeping pangolins in captivity is very difficult and only rarely has been successful, and then only temporarily (Challender et al., 2012b). Therefore, it can be concluded that pangolins cannot be saved from extinction through captive breeding; pangolins must receive more legal protection worldwide to save them from extinction.

V. CONCLUSION

This Petition demonstrates that all seven pangolin currently unlisted species (*Manis crassicaudata*, *M. pentadactyla*, *M. javanica*, *M. culionensis*, *M. tricuspis*, *M. gigantea*, and *M. tetradactyla*) are experiencing rapid population declines throughout their ranges and meet the criteria for an Endangered listing under the ESA. A growing, organized international (and intercontinental) illegal trade in pangolins and their parts and derivatives, as well as inadequate regulatory mechanisms, are placing unprecedented pressure on pangolin populations that will lead to extirpations and even extinctions if unabated. These threats are exacerbated by the low reproductive output of pangolins.

The U.S. is in a unique position as a world leader and pangolin product destination country to significantly reduce demand for these animals by extending ESA protection to all pangolin

species. If these species were listed, direct protection would occur through a prohibition on the import into the U.S. and interstate commerce in the U.S. Furthermore, it would place the U.S. in a position to provide assistance to pangolin range States to improve enforcement of their laws and regulations. The intensified awareness that would result from the listing would serve to highlight the species' plight throughout the world.

Pangolins are one of the most unique creatures in the world. In order for them to survive, the U.S. needs to provide them the highest form of protection through listing them as Endangered under the ESA.

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